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# **A Visualization of the Geoeconomic Relationships Linking Coastal Commercial Marine and Fishing Firms to Tourism Activities found on Long Island, New York**

**Emily A. Fogarty, Sheng Li, Nanda Viswanathan and Richard Vogel\***

## **ABSTRACT**

Geospatial information is important in formulating economic development policies. A map of geoeconomic relationships between selected coastal commercial marine and fishing firms and tourism activities is presented. A network analysis employs suitable metrics to measure the centrality and influence of each firm (sector-agent) on the other ones, and the potential for clustering of related (groups of) activities. Key sector agent linkages are determined in terms of their geographic interconnectedness to each other.

## **INTRODUCTION**

The economic trends and underlying economic policies or conditions of a place can be explored through the use of spatial econometrics. Leveraging geographic information to gain actionable intelligence to strengthen the local marketing connections between marine and coastal fishing firms and the local tourism sector is the main goal of this research. Long Island is home to sport and commercial fishing industries and many world-class events associated with its marine setting. Fisheries, both commercial and recreational, and aquaculture are important economic activities on Long Island (LIRPC, 2011). This paper presents a visualization model of the geographic distribution of potential local marketing connections between marine and coastal fishing firms and the Island's tourism sector.

## **BACKGROUND**

Found in the Northeastern portion of the United States (U.S.), Long Island, New York Figure (1) is an island in the Atlantic Ocean that lies roughly parallel to the southern shore of Connecticut, from which it is separated to the north by Long Island Sound. Long Island's western end forms part of the harbor of New York City and is composed of four counties (from west to east) Kings (Brooklyn), Queens, Nassau, and Suffolk. Figure (2) shows a snapshot of the Island's 2016 population density the darker the color the more people. The darker gray is more urban areas and as one moves out further east towards the Twin Forks, barring the Village of Greenport on the North Fork population density falls to 0 to 1000) people per square mile.

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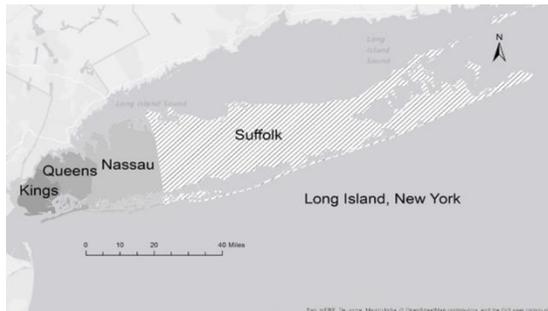
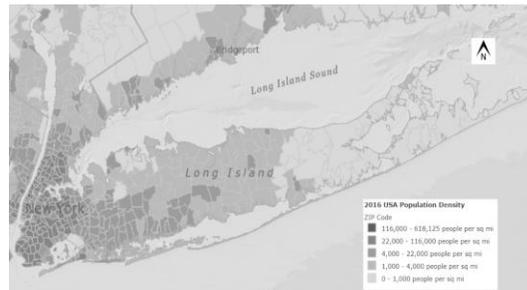
**Figure 1: Long Island Counties****Figure 2: Population Density of Long Island****Figure 3: Satellite view of Long Island, NY**

Figure (3) shows the satellite imagery of Long Island predominantly the farmlands are found on the eastern portion of Long Island's North Fork and South Fork. The more suburban to urban areas are located in the western counties on the Island.

Coastal New York has a long standing association with commercial and recreational uses, from commercial fishing to residential and tourist recreational uses. Recreational fishing alone contributes over \$398 million annually to New York State's output and \$4.4 billion to U.S. gross domestic product (Lovell, Steinback, and Hilger, 2013). Long Island is the second most popular tourist destination in New York State after New York City, with travelers spending over \$4.6 billion in Nassau and Suffolk Counties in 2010 (LIRPC, 2011 p.62). Tourism supports more than 70,000 jobs or 5.9 percent of all jobs on Long Island and is responsible for generating nearly \$600 million in state and local tax dollars. Based on a 4.3 economic multiplier, 2010's Tourism spending had a \$19.7 billion economic impact on Long Island (LIRPC, 2011 p62). Long Island employs an estimated 2,500 people in the fishing and agricultural related industries, with cash receipts in excess of \$240 million annually. Opportunity exists to expand agriculture, fisheries, and tourism via strategic investment within the economic development plan (LIRPC, 2011 p.52). Recent studies such as Nunes et al. (2009) find that coastal resources and ecosystems can contribute significant economic benefits to regional economies especially in terms of coastal tourism and recreational services. Firms need effective decision-making tools that help them create local marketing strategies. Geographic information systems (GIS) technology is an effective tool for visualizing potential geoeconomic connections.

This paper evaluates the geospatial relationship between coastal firms in the Scenic and Sightseeing Transportation, Water sector on Long Island and in particular demonstrates how the geographic proximity of different types of firms towards each other may be able to be used to strengthen overall market outcomes. The Background section provided information regarding population density and land use for the study area of Long Island. The next section of this paper provides information on the distribution of firms used in this study, and a description of the data used and how it was acquired. In the Method and Results section an exploratory overview of data is presented along with a visualization of the data using geographic information systems and network theory. Discussion of results and future work are presented in the Conclusion section.

## **OVERVIEW OF TERMINOLOGIES**

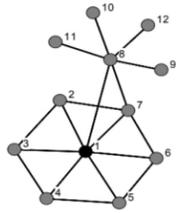
Geospatial is generally accepted to mean “the collective data and associated technology having a geographic or locational component” (Dempsey, 2014). “Geographic information systems,” as Nadine Schuurman (2013) defines them, “are the collection of software, hardware, outputs, personnel, and practices that together facilitate the analysis and mapping of geographic entities and phenomena”. The analytical capabilities of GIS allow for the discovery of spatial relationships among features. There are many analytical functions of GIS that offer database query for both location and attribute values, measurement (including distance), generation and analysis of surfaces, networks, buffers, connectivity, nearness and co-occurrence (Taupeir and Willis, 1994). In this study we evaluate the influence of geography on local/regional economies using Esri Business<sup>2</sup>, ArcMap<sup>3</sup>, ArcGIS Online and Node XL. .

Following Scott (1991) and Wasserman and Faust (1994) our analysis draws upon social network analysis. Networks mathematically are represented as graphs, consisting of nodes and edges. These are depicted such that the lines are the edges and then the various points are referred to as nodes and are presented as both directed and undirected networks. This study makes use of a directed network with a focus on directed network metrics.

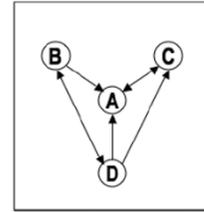
To define degree, a term used in the network results, it means the number of edges that are incident or connected to a particular node or vertex. For example in Figure 4, node number 1 has ten edges incident and therefore its degree would be ten. While the node number 8 has six edges and therefore would be denoted as six degrees. Some network metrics include; average degree, densities and sum of degrees.

In and Out Degree is a network metric, but it is only used in directed graphs. The In and Out degree metric figures help us to understand the number of arcs or edges that terminate at a particular node, coming in or the number of arcs that originate at that node, going out. Consider authors publishing in the field of economics. Authors can be represented as nodes with links to other authors established through a citation. If author A is cited by authors B and C then a network is established between the authors. The collection of authors is called vertexes or nodes and the links connecting them are called edges. Figure (5) is a hypothetical example of a social network of authors linked by citation. If author B cites author A at least once then an arrow from B to A is drawn. If two authors cite each other a double arrow is used.

**Figure 4:** Example undirected network

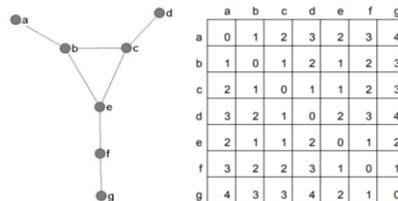


**Figure 5:** Hypothetical directed network of authors publishing in the field of economics, the authors are represented with circles (nodes) and the links indicating at least one citation are indicated with arrows.



Network measurement of length or distance is described in terms of paths and the number of links connected to each of the nodes and the distance between nodes in terms of length of shortest paths, or geodesic paths. A geodesic path is the shortest path through the network from one node to another. When used in social networking these metrics can measure relationships among people. This study uses geographic distances and locations in the network. For example Figure (6) show a geodesic distance matrix. Comparing the value of “3” in (D) from the matrix, the corresponding network is shown on the left. Notice that (D) is three from (A), starting at node (D) you have to pass through (C) and (B), and the third link is to (A). Interestingly, although the network is aspatial, many of the terms used in network analysis suggest spatial or geometric representations, including centrality, distance, isolation, and diameter.

**Figure 6:** Example geodesic distance matrix (shown on the right) along with corresponding network



**METHODS AND RESULTS**

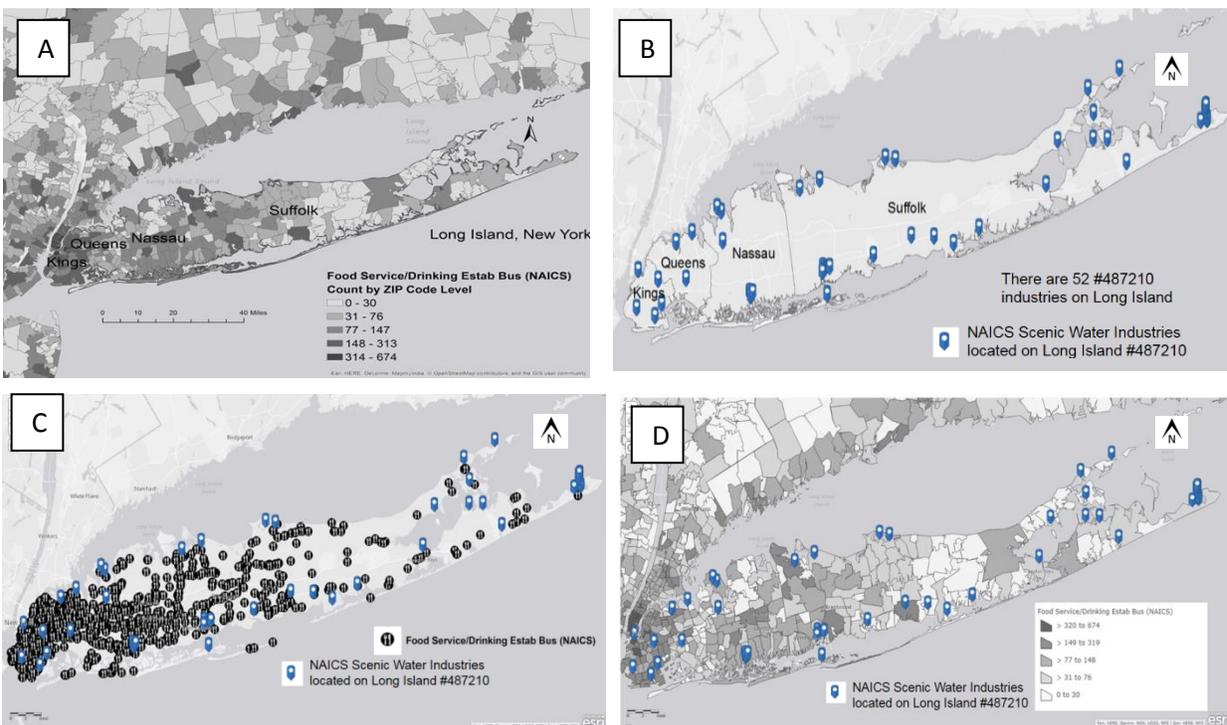
Recently there has been an increased use in the theories of networks and complex system to understand the efficiency and robustness of various economic markets. (Tsekeris 2017). Why look at groups of firms? Cluster analyses stress that the co-location of firms in similar and related economic activities facilitate collective learning and increase the innovation capacity of firms. Community research has shown that attributes of geographically defined localities influence both incentives and outcomes (Christiansen and Jakobsen, 2012).

The main purpose of this research was to demonstrate how coastal firms in the Scenic and Sightseeing Transportation & Water sector (#487210) on Long Island can leverage geographic information in order to evaluate potential inter and intra industry proximity linkages with a particular interest upon establishments in accommodations (#721) and/or for food-service places (#722) (drive time and driving distance). This study focused on (#487210) firms compared to the food service industry (#722) using the geographic

information system software to create maps to visualize the data and use network theory in order to measure the influence of each of the sector agents on one another. This demonstration is accomplished using geographic information systems software to create a maps to visualize the data and use network theory to measure the influence of each firm (sector-agent) on the other ones, and then highlight potential for clustering of related (groups of) activities.

The geoeconomic data used for this study was drawn from ESRI Business Analyst Online, the spatial statistics extension for ArcGIS for desktop as well as Business Analyst Online. ArcGIS Online was used to calculate drive time distances and travel time. Straight-line distances were calculated using the Geographic Distance Matrix Generator (Ersts, P.J., 2017). The resulting map shown in Figure (7A) indicates density where the food service and drinking establishments (#722) are located, the darker the color the more establishments are present. Figure (7B) shows the scenic and sightseeing transportation water (#487210) industries. There are 52 (#487210) industry types found on Long Island. To better visualize the relationships between the (#487210) firms to the (#722) locations, a map overlaying the food-service industries and the water related industries is shown in Figure (7C). Figure (7D) shows the (#487210) industries plotted on the density map. The darker gray areas have more food-service industries available for each of these places to possibly connect to and make linkages.

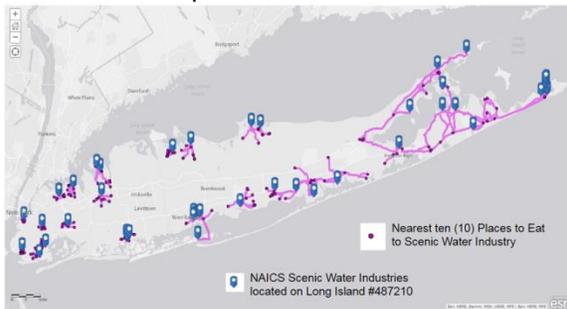
**Figure 7**



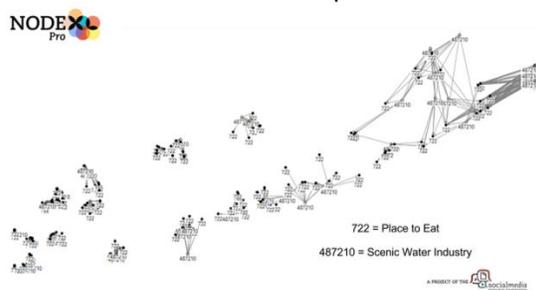
Network Analysis, using the (#487210) firms as a starting point, the drive time estimates to the nearest 10 easting establishment were created in ArcGIS Online (see Figure 8). This information was then put into

the Node XL software to organize data and evaluate how various firms were related to each other. In this case the (#487210) firms are related to each other by geographic distance to eating establishments. The implication is that the firms have activities and connections to one another as a result of their geographic proximity.

**Figure 8:** ArcGIS map the of drive time estimates to the nearest 10 places to eat

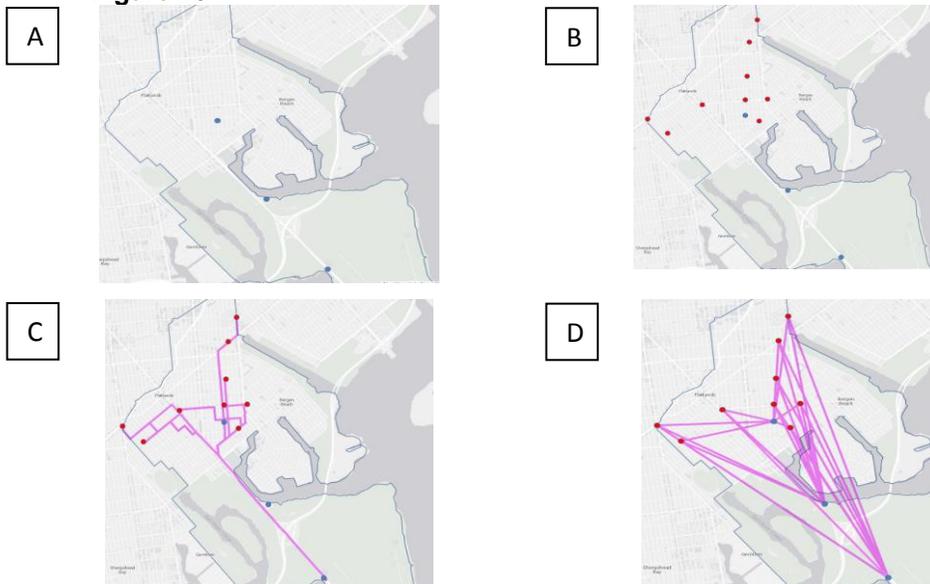


**Figure 9:** ArcGIS map the of drive time estimates to the nearest 10 places to eat



Location data and attributes for each sector were then loaded into Node Excel in order to derive the network analysis (Figure 9). Networks in Figure 9 are denoted simply by their NAICS number and plotted out by their latitude and longitude. The connections are directed from the (#487210) to (#722).

**Figure 10**



We then created a more focused subset of the region and data to highlight some of the network metrics. In the example (see Figure 10) there are three (3) marina based industries (Figure 10A) and nine (9) places to eat (Figure 10B). The question becomes which places to eat are closest to the marinas? How does one know which places have the best drive times? For this example it is an urbanized area so there is not much

difference between drive time (Figure 10C) and as the crow flies distance (Figure 10D). This of course would change if this network was created in a more rural or suburban area on Long Island. Shown in Figure 10 (C) and (D) are the travel distances in minutes and miles along with the straight line distances in miles. Which places listed in Figure (10) in terms of travel distance, sum of travel time or the straight line distance has more influence? Influence can be estimated using inverse distance weighting. The higher the column number total the more influence that that actor (place to eat) is going to have, likely it is the closest geographically to all three marinas.

Figure 11

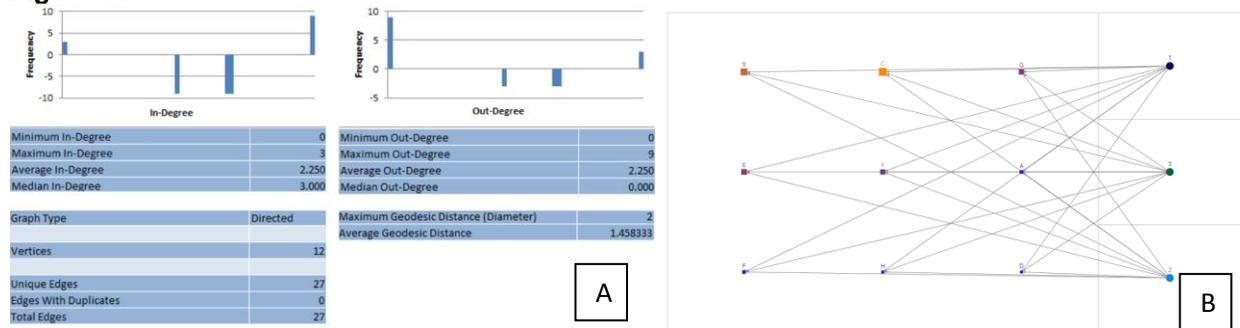
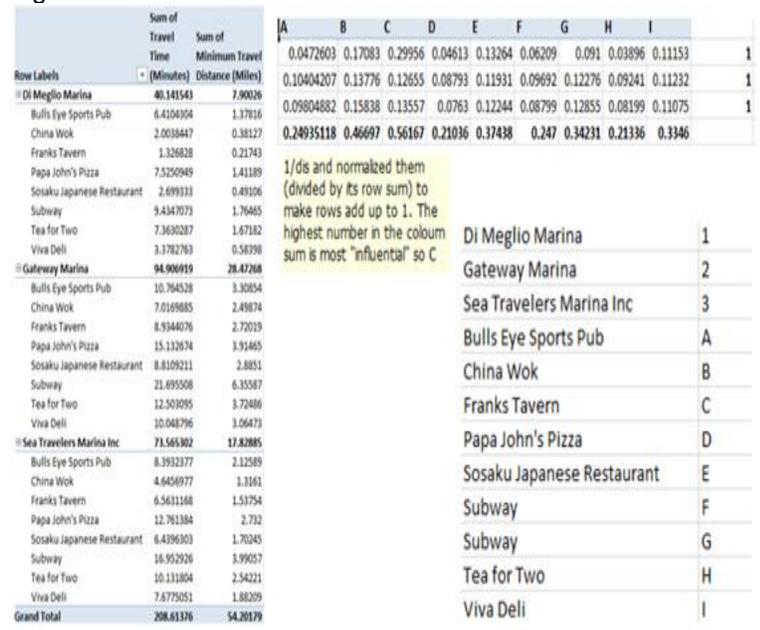


Figure 12



In order to understand the table better, one can view the information as a network, Figure (11B) show the network symbolized by an inverse distance weighting figure from Figure (11B) reveals the largest symbol “C” is the most prevalent node/actor (place to eat) in the network. Network metrics shown in Figure (12A) provides a greater understanding of the locations being used in the network. In this case we have three marinas and nine places to eat, which is reflected in the In and Out Degree figures. Figure (12B) has actual location names to coincide with the letters used. Seeing the names and locations versus just letters and numbers puts context to the actual players. It is clear that Frank Tavern is place “C” and the most influential (geographically). Not too far behind it is place “B” and for this example it is the China Wok. On the left side of Figure (12) is the comparison of the some travel time in distance versus time. These maps, see Figure (12A/B), help us to visualize the table data.

When one can see on the map where these locations are in relation to one another, the data in the tables make more sense. This demonstration uses a small area and example network but these metrics could be applied much bigger more complex network and firms could then make more informed marketing decisions.

## **CONCLUSION**

This study provided an interesting and novel approach to visualizing geographic data in a relational way. Network analysis allows for the researcher to visualize and measure centrality of the influence of each firm on the other. In this analysis, sector-agent linkages were determined in terms of their geographic interconnected to each other. Armed with this geographic information firms could then market to each other.

More connections within and among the activity clusters linking sector-agents operating on the Island, through the use of economic mass and the creation of integrated value chain, would allow for greater coordination between firms, potentially strengthening the local marketing connections between the marine and coastal fishing firms and the Islands’ tourism sector. Future work plans include continuing work with visualizing geo-economic linkages between coastal commercial marine and fishing firms to tourism activities found on Long Island and in particular using a larger sample of marine and fishing firms on Long Island. Other study ideas include investigation of the geo-economic-relationships between popular beach locations and places to eat and/or sleep and/or other coastal activities on Long Island.

## **ENDNOTES**

1. This presentation is a resulting product from project R/CHD-8, entitled Leveraging Long Island’s Coastal Heritage for the Future: Integration and Diversification of Long Island’s Coastal Industries funded under award 67209 from the National Sea Grant College Program of the U.S. Department of Commerce’s National Oceanic and Atmospheric Administration, to the Research Foundation of State University of New York on behalf of New York Sea Grant. The statements, findings, conclusions, views,

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2. Esri extracts its business data from a comprehensive list of businesses licensed from Infogroup®. This business list contains data on more than 12.5 million US businesses—including the business name, location, franchise code, industry classification code, number of employees, and sales volume—this study uses data that is current as of January 2017. For more information and details on data collection methodologies visit <http://doc.arcgis.com/en/esri-demographics/data/business.htm>.
3. Maps throughout this paper were created using ArcGIS® software by Esri. ArcGIS® and ArcMap™ are the intellectual property of Esri and are used herein under license. Copyright © Esri. All rights reserved. For more information about Esri® software, please visit [www.esri.com](http://www.esri.com).

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## The Excelsior Jobs Program: Boon or Boondoggle?

Joseph A. Giacalone\*

### ABSTRACT

This paper examines the New York State's Excelsior Jobs Program, supposedly the premier job creation program of the state's economic development program. Its alleged success has been heavily supported by a large advertising campaign. However, there has been significant criticism of the program. Allegations that the number of jobs created has been grossly exaggerated have been made. Moreover, the cost per job has been deemed excessive by some critics. Is the burden on NYS taxpayers justified or justifiable? The lack of transparency on the part of the Economic Development Corporation about the program is another area of concern, especially from the Office of the State Comptroller. The defenders of the program have argued that the critics have confounded short-term costs with long-term benefits.

### INTRODUCTION

For many years now, individual U.S. states have been offering incentive packages to businesses for the purpose of creating new jobs in their state. The recent 3 billion dollar package offered by the state of Wisconsin to Foxconn has certainly brought this economic development strategy to widespread attention (Horowitz, 2017). Amazon's recent invitation to the states to bid for its proposed "second" has drawn similar attention (Wingfield and Cohen, 2017). This paper addresses this strategy primarily in the context of New York State programs, with special emphasis on the Excelsior Jobs Program.

### EXCELSIOR JOBS PROGRAM: WHAT IS IT?

According to a Fact Sheet (ESD) prepared by the New York State Empire State Development Corporation, the Excelsior Jobs Program is an economic development initiative aimed at creating jobs and stimulating investment in targeted industries and targeted geographical regions. The program favors high-tech industries such as biotechnology, pharmaceuticals, clean-technology, and green technology although financial services, agriculture, and general manufacturing are not excluded. The program uses four tax credits to stimulate job creation through expansion in and relocation to New York State. Alternately, eligibility for the tax credits can be based on making significant financial investment in the state. The program establishes accountability standards and caps financial costs to the state.

The program offers four fully refundable tax credits which can be claimed over a period of ten years. As delineated by the Empire State Development Corporation, these credits are as follows:

1. A Job Tax Credit amounting to 6.85 percent of wages per new job.
2. An Investment Tax Credit valued at two percent of qualified investments.

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3. A Research and Development Tax Credit of 50% of the Federal R & D credit up to three percent of research expenditures in New York State.
4. A Real Property Tax Credit for firms that locate in certain distressed geographical areas and to firms that that meet higher employment and investment thresholds in designated Regionally Significant Projects.

The program is comprised of a Job Growth Track (75%) and an Investment Track (25%). Firms in the investment track are expected to make capital investments in a New York facility which meets a benefit-cost ratio of at least \$10 of investment and new wages for every \$1 of tax credit.

For the targeted industries, the Jobs Growth Track requires a minimum number of jobs created, ranging from five jobs for scientific R & D firms to 100 jobs for an entertainment company. Eligibility for the Real Property Tax credit is restricted to those firms whose project is deemed a "Regionally Significant Project" with minimum job creation ranging from 20 to 300 and minimum investment ranging from \$6 million to \$30 million.

Eligibility for tax credits on the Investment Track mandates the retention of at least 25 employees in the strategic industries with the exception of manufacturing where the threshold is 10 employees retained. The financial investment must have a minimum benefit cost ratio of 10 to 1. There are ten investment zones spread throughout New York State.

#### **WHAT WERE THE ORIGINS OF THIS PROGRAM?**

In early 2015, the Citizens Budget Commission (CBC) released a report delineating the expansion of New York State's economic development efforts (Davidson et al, 2015). The report encompassed several programs, including the Excelsior Jobs Program, the subject of this paper. At that time, the CBC noted that there seemed to be a proliferation of programs that lacked coordination and transparency. It emphasized that "All investments should be coordinated and aligned to regional strategies, performance metrics should be standardized for all programs and across all regions, and more comprehensive disclosure requirements should be put in place so that the costs and benefits of each project can be weighed. In a CBC Policy Brief, Edwards and Friedfel (2015) concluded that all programs should be reevaluated for effectiveness before existing programs are increased or new ones are added. It expressed significant concern over the START-UP NY program which seemed to have the greatest potential for abuse.

In October of 2015, the Citizens Budget Committee released another report that concentrated on the Excelsior Jobs Program which had replaced the Empire Zones program in 2010 (Jain and Copeland, 2015). According to the CBC, the Excelsior program appeared to be an improvement over the Empire Zones program in several important areas. "The reformed program identified specific traditional and growth industries for eligibility, limited the benefit period to five years, set minimum job creation requirements by industry, and provided benefits retroactively based on performance." The CBC further lauded the new program which, "In contrast to Empire Zones, which granted benefits to applicants "as of right" if they met all program criteria, Excelsior benefits must be approved on a case by case basis by Empire State

Development (ESD). In addition, Excelsior had an annual program cap peaking at \$250 million in 2015.” (Jain and Copeland, 2015).

Between 2011 and 2015, various New York State budgets have expanded the Excelsior Program. The overall time horizon for the Program was extended five years, taking it to 2024. The benefit period for participants was increased from five to ten years. Changes were made in three of the four tax credits, providing more generous benefits. Movie production and video game production were added to the list of targeted industries. Moreover, the employment and investment thresholds for program eligibility were reduced making it easier to qualify for tax benefits.

Nonetheless, the CBC still concluded that The Excelsior Program was an improvement over the Empire Zones program. In a comparison of the first two years of both programs, it commented that “Despite changes to the program, Excelsior’s targeting, annual cost caps, reporting, and use of performance-based credits are still stronger than its predecessor.” It is a slimmer and more efficient program than its predecessor, a result of adhering to criteria for quality economic development programs and more robust reporting requirements for participants.

But the CBC also cautioned that the “modifications are worrisome for taxpayers. ESD should remain cautious and vigilant in administering and monitoring the program, and legislators should avoid additional modification to expand it; without careful guidance, Excelsior could slip back into the costly patterns of Empire Zones” (Jain and Copeland, 2015).

### **WHY ALL THE CRITICISM?**

In the latter part of 2016 and most of 2017, various media in New York State were heavily criticizing the Empire State Development Corp. as to the effectiveness and transparency of the Excelsior Jobs Program and related job creation and retention programs. The criticism was based largely on a report issued by the Office of the State Comptroller (OSC, July 2016). The OSC conducted an audit of the Program covering the period July 1, 2010 to September 30, 2015. It found that:

1. the ESD could not provide sufficient documentation that the companies awarded Excelsior tax credits met the statutory eligibility requirements.
1. the ESD retroactively adjusted the job creation metrics downward to align with the a firm’s actual job creation.
2. the ESD used self-reported job creation and/or investment data without independent corroboration.
3. ESD does not properly verify that new jobs meet the Program’s 35-hour weekly work requirement.
4. ESD does not properly verify that jobs have not merely been shifted from existing positions at affiliated companies.

The Comptroller’s Report did not measure the total number of actual jobs created or new investments made. Its focus was on accountability and transparency as the representative of the taxpayers. However, the implications of these findings were that the number of net new jobs created by the Program was likely to be over-stated by ESD since not all the new jobs created were full-time as required nor was there

adequate corroboration. Similarly, some of the “new” jobs created may have been transferred from other entities. A further implication was that some firms in the program were receiving tax credits without having met the job creation and investment goals agreed upon. Such a situation was not in the best interests of the New York State taxpayers.

Not surprisingly, Empire State Development rejected these findings. It argued that “OSC’s findings are based on a fundamental misunderstanding of how the Program works, and the relevant laws, regulations, practices and procedures that govern the Program’s implementation. Moreover, ESD strongly rejects any implication that it was not fully transparent during the audit process. ESD complied with OSC’s requests for information, and made staff available to answer any questions or provide additional explanation.” (OSC, July 2016).

After a subsequent audit of the Empire State Development Corp., the OSC further charged that the Empire State Development was lax in numerous compliance areas. As specified in a Press Release of May 17, 2017 (OSC) Report 2016-5-40), the State Comptroller’s Office reported that: ESD failed to produce many of the statutorily-required performance and outcome reports that were due between April 2012 and September 2016. Auditors found 27 of 57 of general outcome reports, or 47 percent, were not finished (see Exhibit A in the report); 17 programs requiring independently prepared evaluations were not evaluated; and 93 of 152 program-specific reports, or 61 percent, were not completed (see Exhibit in the report).

This report encompassed the totality of ESD job creation projects, not just the Excelsior Program. However, the two audits taken together seem to be representative of the whole NYS job creation effort, at least from the perspective of the State Comptroller’s Office. If the ESD fails in its reporting and compliance responsibilities, how can the job creation and investment metrics be identified and judged on their cost effectiveness.

#### **WHAT HAS THE EXCELSIOR PROGRAM ACHIEVED?**

It could be argued that the audits of the State Comptroller revealed serious breaches of compliance with accountability and transparency standards but that does not mean that the economic development programs in question failed in their job creation and investment objectives. Indeed, Empire State Development reports that over 18,000 net new jobs were created from the 217 active projects in existence at the end of the 2015 calendar year.

A USA Network investigation found that ESD, through the Excelsior Jobs Program, committed \$708 million in tax credits to 450 companies that pledged to create 45,750 jobs (Spector and Lahman, 2017). Their investigation reported that only about 19,000 jobs were created between 2012 and 2016. Yet, the state Comptroller’s Office claimed that ESD could not substantiate many of these Excelsior job claims. Moreover, it argued that ESD retroactively changed the job-creation goals of several companies and failed to account for turnover by counting new employees hired and not new positions created. Another issue was the alleged shifting of employees from related entities to the Excelsior participating firm.

A major objective of the myriad NYS job-creation initiatives was to improve employment in many state regions outside New York City. The USA Today Network study found that, at least from 2009 through 2014, three-quarters of the new jobs were in New York City. Although the NYS unemployment rate declined to 4.6% by January 2017, the labor force outside New York City declined by 3.4% during that period. So, the hoped for regional impact has not occurred despite the considerable sums being spent on job-creation (Spector and Lahman, 2017).

### **WHAT HAS BEEN THE COST OF THESE ACHIEVEMENTS?**

Research at The Pew Charitable Trust and by Timothy Bartik for both the Pew Charitable Trust and the W.E. Upjohn Institute for Employment Research has attempted to measure and evaluate state initiatives aimed at enhancing job creation and investment. New York State economic development programs have been among those in the research.

Bartik and his associates have created a massive database for cataloguing state business incentives and their effects on employment and related economic variables. Entitled “Panel Database of Business Incentives”, it aims to provide researchers and policy makers with empirical data on various business incentives used by state for the purpose of enhancing that state’s economic development, especially as to job creation. At present, the database covers the years 1990 to 2015. The main business incentives included are job creation tax credits and property tax abatements. Coverage includes 33 states which account for 92% of U.S. GDP.

For 2015, the most recent year in the PDIT, total tax expenditures for economic development in New York State were estimated to be \$1.355 billion. Of those tax expenditures, \$150 million are from the Excelsior Jobs Program. The database attributes the remainder as follows: \$427 million are for film credits, \$204 million are from the expired Empire Zone program, \$146.2 million are for investment tax credits, and \$130 million are for brownfield tax credits.(PDBI). Additionally, best estimates for property tax abatements to industrial and commercial property are \$1.888 billion for NYC in 2015 which provides the best data on this. For the rest of NYS, the report provides a figure of \$209 million property tax relief for the rest of the state but dating For 2015, the most recent year in the PDIT, total tax expenditures for back to 2009.

These tax expenditures outside of the Excelsior Jobs Program are mentioned here because there seems to be a growing consensus among research organizations that there are too many state economic development programs whose accountability and effectiveness are in serious doubt. More on this below.

### **ARE THESE COSTS JUSTIFIED OR JUSTIFIABLE?**

The existing research on incentives is that in some cases they can affect business location decisions, but that in many cases they are excessively costly and may not have the promised effects. The new research suggests that much of this consensus is justified (Bartik 2017).

*Incentives are still far too broadly provided to many firms that do not pay high wages, do not provide many jobs, and are unlikely to have research spinoffs. Too many incentives excessively sacrifice the long-*

*term tax base of state and local economies. Too many incentives are refundable and without real budget limits. States devote relatively few resources to incentives that are services, such as customized job training. Based on past research, such services may be more cost-effective than cash in encouraging local job growth (Italics for emphasis).*

Though Bartik (2017) points out that work with this new database of incentives and taxes is preliminary, he makes the shocking conclusion that state incentives are not correlated with a state's economic fortunes. Neither do they have a large correlation with a state's current or past employment nor with income levels or with future economic growth. If confirmed by further research, this puts the whole rationale for state economic development programs in serious doubt.

Another questionable aspect of state economic development programs such as Excelsior is the inter-state competition. Many state programs are unabashedly trying to lure companies and their jobs from other states by dangling various economic incentives (McDermott, June 7, 2017). The recent announcement by Amazon that it will be creating a second "headquarters" has put this inter-state competition in the headlines (Wingfield and Cohen, Sept.7, 2017). Various locales in the U.S. will be "bidding" for this estimated \$5 billion project. This inter-state competition is obviously a two-edged sword in that firms can come and go. Such competition, if it involves new job creation, might potentially benefit a particular state. On the other hand, it does nothing for the country as a whole if jobs just shift from one state to another. Note that Amazon had previously announced it was going to place a 2000+ job distribution center in Staten Island, NY. The full details of any state incentives for this facility have not been released (source).

It should also be pointed out that, in their defense, New York State economic development officials charge their critics with underestimating the job creation and investment results of their programs. Moreover, they contend that such programs must be viewed from a long-term perspective. The ultimate positive results, it is argued, cannot be fully achieved in a short-term time horizon. This is especially true, they contend, when a state like New York is trying to undo decades of bad policy (Spector and Lahman, 2017).

## **CONCLUSION**

It is clear that state economic development programs which provide tax relief and other incentives in return for job creation is pervasive and New York is heavily in the game. However, the work of the Upjohn Institute and the Pew Charitable Trust, among others, show that there is a deficiency in the metrics and transparency in the assessment of these programs. It is difficult to measure the cost per job to the taxpayers if the number of jobs created cannot be properly accounted for. It seems evident from this secondary research that timeliness and transparency of reporting need considerable improvement. It seems pretty clear that New York, like many other states, is spending billions for these economic development initiatives. However, their effectiveness and efficiency is far from being assured.

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## Is There Bias in the New Moody's Rating Methodology for the General Obligations of Local Governments in New York State?

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### ABSTRACT

The paper presents an analytic ordered probit model that uses data from the *Decennial Census of Population and Housing*, the *American Community Survey*, and the *Census of Governments* for individual governmental units, as well as BLS and BEA data for overlying counties to replicate, to the greatest extent possible, the quantitative ratings process for the underlying 2014 Moody's ratings of the general obligations of local governments in the United States.

### INTRODUCTION

As a dominant force in the municipal credit rating market, Moody's Investors Service had been criticized for employing a process that lacked transparency, was not easily understood by professionals or the general public and generated lower ratings, and therefore higher borrowing costs for instruments with less risk of default than corporate bond equivalents (Moody's Special Comment, 2006). In response to these criticisms, Moody's recalibrated the ratings of the general obligations of state and local governments, shifting from a relative to a global scale in 2010 (Moody's, 2010). This recalibration moved the general obligation ratings for most issuing governments up, between two and three steps.

After the recalibration, Moody's published a guide describing a quantitative ratings methodology *US Local Government General Obligation Debt* (Moody's, 2014). This report described a data driven model for generating a portion, approximately 60%, of the underlying credit ratings of governments issuing general obligation bonds. This model is the most detailed description of the ratings process revealed to date. This paper adds variables to identify government type, racial composition, and other qualitative factors. The results suggest that Moody's ratings of New York State local governments are biased – with lower ratings for counties in New York State compared to counties in the rest of the nation. It is possible that the bias could be a result of omitted variables in our model rather than the ratings process.

The importance of a consistent and transparent process to the users of ratings on the buy and sell side can't be overstated. Ratings agencies, bond issuers, bond insurers and portfolio managers all benefit from a ratings process that does not show differential treatment based on type of government, political boundaries or racial composition. While the significance of governmental organization, racial composition and past credit ratings variables have been discussed in the recent literature, to our knowledge this is the first time that the local government ratings of an entire state seem to reveal differential treatment.

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## GENERAL OBLIGATION RATINGS OF LOCAL GOVERNMENTS

Issuers apply for a rating by sending the rating agency an official statement with financial projections and audits. After analysts review and analyze the data, a rating committee reviews the tentative rating that a lead analyst provides. Though, the actual issuance of a rating requires that a contract be signed and that fees be paid to the agency by the municipality. During the period leading up to the 2008 financial markets crisis and then following the resultant recession, there was considerable criticism about the validity of a rating process that is perceived by some to be little more than a fee for service relationship. In addition to initial ratings, Moody's reviews any changes in credit risk as they occur. The *Moody's Watchlist* indicates those issues whose underlying governments have experienced fundamental changes and are under review for possible upgrades or downgrades.

Table 1 shows the underlying general obligation credit ratings issued by Moody's for general purpose local governments for the years 2006 and 2014. Since the ratings of general obligation bonds are parity ratings, all outstanding general obligation bonds issued by a general purpose government will carry the same underlying ratings. These ratings do not reflect enhancements from third parties.

**Table 1: Moody's Underlying Credit Ratings: 2006 & 2014**

Rating	2014 Frequency	2014 Percent	2006 Frequency	2006 Percent	Percent Change 2006-2014
Aaa	209	8.44%	100	4.06%	109%
Aa1	254	10.26%	87	3.54%	192%
Aa2	786	31.76%	223	9.06%	252%
Aa3	508	20.53%	361	14.67%	41%
A1	482	19.47%	471	19.14%	2%
A2	134	5.41%	468	19.02%	-71%
A3	38	1.54%	409	16.62%	-91%
Baa1	30	1.21%	190	7.72%	-84%
Baa2	17	0.69%	98	3.98%	-83%
Baa3	9	0.36%	46	1.87%	-80%
Ba1	3	0.12%	7	0.28%	-57%
Ba2	1	0.04%	0	0%	n.a.
Ba3	1	0.04%	1	0.04%	0%
B1	3	0.12%	0	0%	n.a.
<b>Total</b>	<b>2475</b>		<b>2461</b>		

The underlying credit ratings may reflect the ratings at the time of issue, or a rating that reflects some change in the perceived creditworthiness that occurred after issue and before the date the rating was collected. Indeed there may have been several positive or negative rating changes between the date of issue and the date the current ratings were collected.

For simplicity, the date of the credit ratings in the paper will be identified as the date at which the data was collected: 2006 for the earlier sample and 2014 for the later sample. The economic, demographic, fiscal and financial data for 2006 is based on Bureau of Economic Analysis (BEA), Bureau of Labor Statistics

and Census of Governments (COG) data for 2002, and decennial Census of Population and Housing (COP) data for 2000. These reflect the most recent information that was available to Moody's analysts in 2006. The data sources available to analysts in 2014 were BEA, BLS and COG for 2012. The economic and demographic information was changed somewhat from the previous decade with the 2010 COG as the source of most demographic information and the American Community Survey (ACS) providing socio-economic data.

Table 2 below shows the distribution of Moody's ratings for the long-term obligations of general purpose local governments by the type of government. In 2006, 31.3% of the Moody's general obligation ratings were Aa3 or above, by 2014 that proportion had increased to 71.0%. The recalibration of underlying ratings that occurred in 2010, along with the relative increase in creditworthiness of local governments, were in large part responsible for the change in ratings. Similarly, at the low end of the rating distribution, 13.9% of general purpose governments had GO ratings below A3 in 2006, and by 2014 that number had declined to 2.6%. Thus, over a period including the financial market crisis and the most severe recession since the Great Depression, the perception of the credit quality of local general purpose governments as represented by Moody's ratings increased dramatically.

**Table 2: 2006 Moody's Ratings 2014 Scale**

Rating	2006 Moody's Ratings 2014 Scale			2014 Moody's Ratings 2014 Scale		
	Counties	Municipalities	Towns	Counties	Municipalities	Towns
Aaa	38	55	7	60	109	40
Aa1	25	56	6	65	137	52
Aa2	76	124	23	193	393	200
Aa3	100	218	43	113	264	131
A1	134	275	62	111	301	70
A2	125	297	46	23	86	25
A3	121	248	40	2	29	7
Baa1	35	143	12	3	24	3
Baa2	24	66	8	2	13	2
Baa3	6	39	1	1	7	1
Ba1	0	7	0	1	2	0
Ba2	1	0	0	0	1	0
Ba3	0	0	0	0	1	0
B1	0	0	0	0	3	0
<b>Total</b>	<b>685</b>	<b>1528</b>	<b>248</b>	<b>574</b>	<b>1370</b>	<b>531</b>

## LITERATURE REVIEW

Palumbo and Zaporowski (2012) present a more complete literature review and translate ordered probit coefficients into marginal probabilities substantiating the primacy of economic and demographic characteristics and find that debt as a percent of market value plays a significant role in the perception of credit quality. Kriz and Xiao (2017) examine the effects of the global rating recalibration conducted by Moody's in 2010. Using time series methods, they find that the rating recalibration brought a structural change to the municipal bond market and increased the yield spread of municipal bonds in the Aaa, Aa,

and A rating categories over their risk-free comparison group by approximately 15 basis points. Maher et al. (2016) found that the presence of tax and expenditure limits are associated with lower credit ratings, but also found that higher concentrations of white population are associated with higher credit ratings. While tax and expenditure limits are specifically addressed in Moody's rating methodology, there is no stated relationship between racial composition and ratings identified in the report.

### **FACTORS AFFECTING RATINGS**

The major factors that determine the underlying creditworthiness of a local government's general obligations are economic/demographic, fiscal/financial, governmental, and debt/pension (see Moody's, 2014). While there are a wide variety of sub-categories that can be used to adjust the ratings generated by these factors; the broad categories provide some communality and transparency to the process.

The fiscal health of a municipality is related directly to the revenue it receives and the dollars it spends to provide services. The fiscal capacity of a community is typically determined by the size of the bases that can be taxed, generally, property, sales, income or wages. Local governments in the U.S. rely most heavily on the ad valorem property tax, followed by excise-sales, and wage or income taxes. Either directly or indirectly, the level of earnings in a community affects the size of these bases and the tax revenues they can generate. Fees and charges are often collected, but that revenue is generally linked to the debt service on non-guaranteed debt. Some of these revenue sources can be exported to consumers outside of the jurisdiction collecting the fees, but employment, earnings and total income are the drivers for most of the local government tax bases.

Another element of a community's fiscal capacity is the aid it receives in the form of intergovernmental transfers. These transfers can be categorical or general, formula or project, matching or lump-sum. Their purpose can be to share revenue or to stimulate governmental activity. Whatever the reason for the grants, the recipient community's ability to provide public services is affected and may result in diminished local contributions to pay for those services. State governments that mandate expenditure programs that local governments must support often use intergovernmental transfers to share part of the financing responsibility for these services. When recipient governments become overly dependent on intergovernmental revenue, they can have their creditworthiness compromised in two ways. The first is through the downgrading of the credit rating of the transferring government. It is difficult for a recipient government to be perceived as sounder than the government that provides a substantial portion of the recipient government's revenues. Secondly, if the aid flows are *ad hoc* in nature or are appropriated on an emergency basis, then they could be perceived as more easily interrupted than aid that is built into a formula and is viewed as ongoing. In addition, states can affect a local government's revenue raising capacity through tax and debt limits.

The credit rating process attempts to determine whether the revenue generating capacity of a local government is adequate to meet its debt service requirements. A few of the important debt variables for consideration in creditworthiness include: total direct debt, net direct debt and debt per capita. Total direct debt is defined as the sum of any short-term notes and any general obligation debt outstanding. Net direct debt is calculated by subtracting sinking funds, reserve funds and all debt that the municipality isn't actually

responsible for, from total direct debt. Much, though not all of the debt data available for analysis, was compiled by the U.S. Bureau of the Census in 2012.

Full market value, taxable value or assessed valuation provide a proxy for revenue capacity, but the variation across jurisdictions of assessment techniques, exemptions, abatements and timely market valuations makes fiscal capacity measurement difficult.

In addition to the debt factors are the pension and health insurance liabilities that have accrued for past and current employees, as well as those that will accrue for future employees over the life of the obligation. There are significant variations among the states concerning the extent to which local governments are responsible for the funding of future pension and health insurance liabilities. Additionally, state governments can and have returned the revenue raising responsibility for pensions to local governments in periods when state pension systems have failed to provide adequate revenues to meet responsibilities.

The ratings assigned to bond issues by Moody's in this analysis range from highest quality (Aaa) with the lowest probability of default to junk bond status (Ba) with the highest probability of default. The ratings that qualify a bond as investment grade are: Aaa, Aa, A, Baa, with gradations within each class of 1, 2 or 3. This rating scheme yields a total of twelve rating categories. Smaller values of the dependent variable imply higher creditworthiness and a lower probability of default. A negative value for an estimated coefficient would therefore indicate a direct relationship between the explanatory variable and credit quality, while a positive coefficient indicates an inverse relationship between the explanatory variable and credit quality.

### MODELING THE RATINGS PROCESS

Between 2002 and 2016, a series of methodological papers outlining the bond rating process were made publicly available by Moody's Investor Services (see references). These sources identify the factors that guide the credit rating process at Moody's for governments that issue long-term debt. To model this process we assume there exists a latent index for each issuing government,  $R_i^*$ , that determines the probability of default and consequently, the bond rating for government  $i$ 's general obligation debt.  $R_i^*$  is linearly related to a vector of economic, demographic, fiscal, intergovernmental and financial explanatory variables ( $X$ ) via the following:

$$(1) \quad R_i^* = \beta'X + \varepsilon,$$

where  $\varepsilon$  is assumed to be an independently and identically distributed normal random variable. Although  $R_i^*$  is unobservable, we observe the underlying rating ( $R_i$ ) assigned to government  $i$ 's general obligation bonds. the observed credit rating on issue  $i$ ,  $R_i$ , is determined from  $R_i^*$  as follows:

$$(2) \quad R_i = \begin{cases} 1 & \text{if } R_i^* \leq \mu_1 \\ 2 & \text{if } \mu_1 < R_i^* \leq \mu_2 \\ 3 & \text{if } \mu_2 < R_i^* \leq \mu_3 \\ \vdots & \\ 14 & \text{if } R_i^* > \mu_{13} \end{cases}$$

The cutoff points for each rating are represented by the  $\mu$  parameters. As  $\mu_i$  increases, the creditworthiness of the issuer decreases, the risk of default increases, and the credit rating agency assigns a lower rating to the government. The conditional probability of observing each value of  $R$  is given by:

$$\begin{aligned}
 P(R_i = 1 \mid X, \beta, \mu) &= \Phi(\mu_1 - \beta'X) \\
 P(R_i = 2 \mid X, \beta, \mu) &= \Phi(\mu_2 - \beta'X) - \Phi(\mu_1 - \beta'X) \\
 &\vdots \\
 &\vdots \\
 &\vdots \\
 P(R_i = 14 \mid X, \beta, \mu) &= 1 - \Phi(\mu_{13} - \beta'X),
 \end{aligned}
 \tag{3}$$

where  $\Phi$  is the cumulative normal distribution function. The  $\beta$  and  $\mu$  parameters are estimated by maximizing the following log likelihood function (Kaplan and Urwitz, 1979),

$$L(\beta, \mu) = \sum_{i=1}^n \sum_{j=1}^{14} \log(P(R_i = j \mid X, \beta, \mu)) \lambda(R_i = j),
 \tag{4}$$

where  $\lambda(R_i = j)$  is a logical function that takes on the value 1 if  $R_i = j$  and the value 0 if  $R_i \neq j$ .

While Aaa rated issues can be perceived to have lower levels of default risk than Aa1, and Baa3 issues have lower risk than those rated Ba1, the rating categories should not be treated as equally spaced discrete intervals, since credit ratings are measured on an ordinal rather than an interval scale. Unlike OLS, probit analysis allows for the estimation of cutoff points associated with various levels of credit quality. The explanatory variables included in the model appear in Table 3 and are similar to those employed in the existing literature. The ability of debt issuing governments to meet their future obligations is directly related to their expenditure commitments and their fiscal capacity. Own source revenues are predominantly comprised of taxes, fees and charges. At the local level, the principal tax bases are consumption and property values.

The estimated coefficients of the model appear in Table 4. Avoiding the mathematical complexities, it can be stated that a positive estimated coefficient on an explanatory variable results in a reduction in the probability of falling into the highest ratings category (Aaa) and an increase in the probability of falling into the lowest ratings category (Ba3). The effect of a one unit change in an explanatory variable on the ratings categories between the highest and lowest is not readily apparent without additional calculations estimating marginal impacts of each explanatory variable on inclusion in each rating category.

The marginal impacts on probabilities of inclusion in each rating category are presented in Tables 5a-5d (see Greene). Missing ratings categories in these tables indicate a zero marginal impact. An increase in each of the variables listed in Tables 5a and 5b, *ceteris paribus*, decreases the probability of falling into the highest rating categories (Aaa – Aa2), while increasing the probability of falling into the lowest rating categories (Aa3 – Ba2). An increase in each of the variables listed in Table 5c, *ceteris paribus*, increases the probability of falling into the highest rating categories (Aaa – Aa2), while decreasing the probability of falling into the lowest rating categories (Aa3 – Ba2).

**Table 3: Variable Definitions and Mean Values**

<b>Variables</b>	<b>Means</b>
RECAL = 1 if all change in ratings occurred at the time of or before recalibration (2010); 0 otherwise	0.89
BLACK = the ratio of black residents to the total population	0.09
CITY = 1 if government is city or village; 0 otherwise	0.59
TOWN = 1 if government is town; 0 otherwise	0.13
AIDEXP = intergovernmental revenue as % of total expenditures (2012)	0.21
POPCHANGE = ratio of 2010 population to 2000 Census population	0.14
ST13 = Moody's credit rating for state government in 2013	1.71
POP = 2010 Census population in thousands \$	110.24
RAT02 = quantitative Moody's 2002 credit rating	2.73
GFBAL = general fund balance in thousands (2010)	19.23
INTTHS = interest payments in thousands \$ (2012)	11.92
NONREVDEBT = Total long term debt minus public debt for private purposes thousands \$ (2012)	232.88
MEDHVAL = ACS median housing value thousands \$ (2010)	227.38
MEDFI = ACS median family income thousands \$ (2010)	71.59
DIREXP = direct expenditures thousands \$ (2010)	277.81
TLIM = 1 if state tax limits exist for local governments; 0 otherwise	0.26
ELIM = 1 if state expenditures exist local governments; 0 otherwise	0.50
CDIV = industry employment concentration/ diversity ratio where higher values indicate more concentration	0.11
UR13 = BLS unemployment rate for overlying county (2013)	7.00
PER250 = ratio of households with personal income > \$250,000	0.35
NYS = 1 if government located in New York State; 0 otherwise	0.12
NYSCITY = 1 if local government is a city or village located in New York State; 0 otherwise	0.06
NYSTOWN = 1 if local government is a town located in New York State; 0 otherwise	0.03

The explanatory variables that have the greatest marginal impact include the municipality's 2002 rating, the percent black, the aid to expenditure ratio, the state rating in 2013, the industry employment concentration, the city and town dummies, the recalibration dummy, population change between 2000 and 2010, and each of the New York State variables. A one percentage point increase in the percent black, for example, decreases the probability of receiving a Aa2 rating by 11.0 percentage points, while simultaneously increasing the probability of receiving a Aa3 rating by 9.79 pps. The marginal impacts for the remaining variables can be interpreted in the same manner.

Table 5d shows the results for the New York State variables – because NYSCity and NYSTown are included in the specification, the NYS variable represents counties in New York State, the omitted government type. These results demonstrate that New York State counties are less likely to be given ratings of Aaa, Aa1 and Aa2 than are counties in the remainder of the U.S. This may result from the

additional fiscal burden borne by counties in New York State, as they are responsible for a portion of the welfare payments to its residents. In contrast, cities and towns in New York are more likely to be given ratings of Aaa, Aa1 and Aa2 than are cities and towns in the remainder of the U.S. This may be a function of the availability of other sources of revenue to cities and towns in New York State in comparison with the rest of the nation.

**Table 4: Ordered Probit Estimates**

VARIABLE	COEFFICIENT	Z-STATISTIC	P-Value
RECAL	-1.4179	-15.15	0.000
BLACK	0.3443	1.40	0.160
CITY	0.3757	4.00	0.000
TOWN	0.7715	5.44	0.000
AIDEXP	0.2896	1.32	0.186
POPCHANGE	-0.1880	-1.84	0.065
ST13	0.1531	2.54	0.011
POP	0.00096	6.07	0.000
RAT02	2.6118	32.82	0.000
GFBAL	-0.0147	-11.04	0.000
INTTHS	0.0029	2.19	0.028
NONREVDEBT	0.0001	1.79	0.074
MEDHVAL	0.0006	1.10	0.269
MEDFI	-0.0156	-6.58	0.000
DIREXP	-0.0003	-4.00	0.000
TLIM	0.0389	0.39	0.699
ELIM	0.0121	0.17	0.865
CDIV	2.7844	3.60	0.000
UR13	0.0268	1.33	0.185
PER250	-0.0639	-0.26	0.793
NYS	0.8741	4.18	0.000
NYSCITY	-0.6417	-2.92	0.003
NYSTOWN	-1.1505	-4.38	0.000
Log Likelihood	-1585.11		
Limit Points: $\mu_1=2.37$ ; $\mu_2=3.93$ ; $\mu_3=6.22$ ; $\mu_4=7.59$ ; $\mu_5=9.40$ ; $\mu_6=10.29$ ; $\mu_7=10.57$ ; $\mu_8=10.95$ ; $\mu_9=11.10$ ; $\mu_{10}=11.33$ ; $\mu_{11}=11.49$ ; $\mu_{12}=11.58$ ; $\mu_{13}=11.71$			

**Table 5a: Marginal Impact of Changes in Explanatory Variables on Probability of Inclusion in Rating**

Rating	BLACK	AIDEXP	ST13	POP	RAT02	INT	NONREV DEBT
Aaa	-0.0003	-0.0002	-0.0001	-0.0000	-0.0021	-0.000002	-0.000
Aa1	-0.0198	-0.0167	-0.0088	-0.0001	-0.1505	-0.0002	-0.000007
Aa2	-0.1101	-0.0926	-0.0489	-0.0003	-0.8349	-0.0009	-0.00004
Aa3	0.0979	0.0824	0.0435	0.0003	0.7427	0.0008	0.00003
A1	0.0320	0.0269	0.0142	0.0001	0.2426	0.0003	0.00001
A2	0.0003	0.0002	0.0001	0.000	0.0021	0.000002	0.000
A3	0.000	0.000	0.000	0.000	0.00005	0.000	0.000
Baa1	0.000	0.000	0.000	0.000	0.00002	0.000	0.000

**Table 5b:** Marginal Impact of Changes in Explanatory Variables on Probability of Inclusion in Rating

Rating	MEDHVAL	CDIV	UR13	ELIM	TLIM	TOWN	CITY
Aaa	-0.0000	-0.0023	-0.00002	-0.00001	-0.00003	-0.0003	-0.0004
Aa1	-0.00003	-0.1604	-0.0015	-0.0007	-0.0022	-0.0270	-0.0235
Aa2	-0.0002	-0.8900	-0.0086	-0.0039	-0.0125	-0.2728	-0.1157
Aa3	0.0002	0.7917	0.0076	0.0035	0.0111	0.1846	0.1061
A1	0.00006	0.2587	0.0025	0.0011	0.0037	0.1134	0.0332
A2	0.0000	0.0022	0.00002	0.00001	0.00003	0.0020	0.003
A3	0.0000	0.00005	0.0000	0.0000	0.0000	0.00006	0.00001
Baa1	0.0000	0.00002	0.0000	0.0000	0.0000	0.00002	0.0000

**Table 5c:** Marginal Impact of Changes in Explanatory Variables on Probability of Inclusion in Rating

Rating	POP CHANGE	GFBAL	MEDFI	RECAL	PER250	DIREXP
Aaa	0.0002	0.00001	0.00001	0.0004	0.00005	0.000
Aa1	0.0108	0.0008	0.0009	0.0369	0.0037	0.00002
Aa2	0.0601	0.0047	0.0050	0.4760	0.0204	0.00009
Aa3	-0.0534	-0.0042	-0.0044	-0.2232	-0.0182	-0.00008
A1	-0.0175	-0.0014	-0.0014	-0.2789	-0.0059	-0.00003
A2	-0.0002	-0.00001	-0.00001	-0.0104	-0.00005	0.0000
A3	0.0000	0.0000	0.0000	-0.0005	0.0000	0.0000
Baa1	0.0000	0.0000	0.0000	-0.002	0.0000	0.0000
Baa2	0.0000	0.0000	0.0000	-0.00003	0.0000	0.0000

**Table 5d:** Marginal Impact of Changes in Explanatory Variables on Probability of Inclusion in Rating

Rating	NYS	NYSCITY	NYSTOWN
Aaa	-0.0003	0.0016	0.0079
Aa1	-0.0283	0.0629	0.1678
Aa2	-0.3094	0.1458	0.1353
Aa3	0.1977	-0.1727	-0.2654
A1	0.1374	-0.0373	-0.0453
A2	0.0027	-0.0002	-0.0002
A3	0.0001	0.0000	0.0000
Baa1	0.00004	0.0000	0.0000

## CONCLUSION

The Moody's rating from 2006 and earlier have a significant impact on ratings in 2014, despite recalibration and controlling for the factors that Moody's claims determine current ratings. Additionally, it appears that city and town governments have lower ratings than counties, even though racial composition, poverty, income and housing values have been included as control variables. The estimated marginal impacts of the variable measuring the racial composition of the population are noteworthy. No place in the Moody's methodology is race an indicator of credit quality. Further analysis is required to determine what this estimate means and to examine the possibility that the black ratio variable is correlated with some other variable that has been omitted from the model specified above.

Finally, it appears that Moody's systematically treats municipalities in New York State differently when assigning ratings. Counties in New York State are more likely to be assigned lower ratings (Aa3 and lower) and cities and towns in New York State are more likely to be given higher ratings (Aa2 and higher). This could be evidence that there is some bias in the Moody's review and ratings process, or it could be that the ratings reflect some qualitative factor associated with municipalities in New York State, like where New York State counties bear some responsibility for welfare payments to its residents.

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## Recent Employment Trends in New York City's Securities Industry

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### ABSTRACT

While its function as one of the principal economic engines in New York City (NYC) has decline in recent years, particularly after the 9/11 terrorist attacks and the 2008 financial crisis, the securities industry continues to play an important role in the City's economy. It is an important source of employment (directly and indirectly), pays relatively-high wages and salaries, and makes valuable contributions to the City's fiscal balance as a leading source of tax revenue. This paper analyzes the evolution of employment in NYC's securities industry during the 2000-2016 period. We focus on the impact of the September 11, 2001 terrorist attacks and the 2008-2009 financial crisis on employment in this vibrant component of the City's financial sector.

### INTRODUCTION

The securities industry is comprised of securities, commodities, and financial sales agents (BLS, 2018). Enterprises in the securities industry (e.g., securities, commodities, and financial sales agents) serve as intermediaries between buyers and sellers in financial markets; they sell securities to individual and institutional investors, offer financial advice to their clients, and conduct trades on behalf of their customers (i.e., agency trades) and for their own accounts (i.e., proprietary trades) (BLS, 2018).

According to the U.S. Bureau of Labor Statistics (BLS), the securities industry employed 934,600 individuals in the United States in 2016 (BLS, 2016). Close to one-fifth (18.4%) of all U.S. securities industry employees were located in New York City (NYC), highlighting the City's importance as a center for this vital sector of the U.S. economy (BLS, 2016). Driven by industry consolidation, technological changes, increased competition from other global financial centers, and lower profitability levels, employment in the NYC securities industry declined 0.9% (or by 1,600) in 2016, compared to the previous year (BLS, 2016). Nonetheless, after hitting bottom in 2009, with a total of 164,600 positions, by the end of 2016, NYC's securities industry had gained 7,800 jobs, representing an increase of 4.7% during this period (BLS, 2016; SIFMA, 2017).

This paper analyzes the evolution of employment in NYC's securities industry between 2000 and 2016. Focusing on this time period allows one to capture the impact of two major events on the industry's employment in NYC, which had (and continue to have), major repercussions for the City's economy: (1) the terrorist attacks of September 11, 2001, and (2) the 2008 financial crisis.

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**EMPLOYMENT IN THE NYC SECURITIES INDUSTRY: 2000-PRESENT**

The securities industry is of particular importance to the NYC economy due to its local concentration, high wages, and multiplier effects (Cantor, 1997; SIFMA, 2017). As Table 1 indicates, 84.8% (or 938) of the 1,106 broker-dealers registered in New York State (NYS) are located in New York County, mainly in Manhattan. The other NYS counties with a significant concentration of broker-dealers are Nassau County, with 4.7% (or 52) and Suffolk County, with 2.5% (or 28), respectively (Table 1). With a combined total of 1,018 broker-dealers, these counties and New York County account for 92% of the total broker-dealers registered in NYS (Table 1).

**Table 1.** Broker-Dealers in NYS, 2016

<b>County</b>	<b># of Broker-Dealers</b>	<b>% of Total</b>
Albany	6	0.5%
Erie	9	0.8%
Monroe	9	0.8%
Nassau	52	4.7%
<b>New York</b>	<b>938</b>	<b>84.8%</b>
Onondaga	5	0.5%
Queens	9	0.8%
Suffolk	28	2.5%
Ulster	3	0.3%
Westchester	47	4.2%
<b>Total</b>	<b>1,106</b>	<b>100.0%</b>

Sources: SIFMA, 2017; and authors' calculations.

It is worth noting that both Nassau and Suffolk Counties are located in relative proximity to NYC, and enjoy many of the competitive advantages that attract the securities industry and contribute to its regional clustering. The most significant advantages include: an interconnected and highly-efficient transportation, direct connections with global financial centers via the region's three major airports (i.e., Kennedy International Airport (JFK), La Guardia Airport (LGA), and Newark-Liberty International Airport (EWR)) and major seaports (i.e., the Port of NY and NJ, located outside Elizabeth, NJ), and the, extensive communications networks, access to a highly-qualified and productive labor pool, the nation's highest per capita income, the concentration of other key industries or sectors, and several highly-ranked colleges, and universities (Porter, Ketels, and Vallejo, 2013; Collier, *et. al.*, 2015).

Historically, Downtown (or Lower) Manhattan has enjoyed a disproportionate concentration of securities industry firms and employment; however, the industry's concentration in the Wall Street (or Lower Manhattan) area has declined in recent years. Employment in NYC's financial services sector, which includes the securities industry, was severely disrupted by the September 11, 2001, terrorist attacks (Pohl, 2004; DiNapoli, 2016). According to Pohl (2004), an estimated 50,000 financial services employees were displaced after 9/11. The majority (62%) were relocated to Midtown Manhattan, which has attracted a growing number of financial services firms and their employees in recent years (Pohl, 2004).

The relocation of a significant part of the City's financial services sector, including the securities industry, from the Wall Street area (in Downtown Manhattan) to Midtown Manhattan since 9/11 has been driven by several important "push factors." These include: the psychological impact of the 9/11 terrorist attacks, the destruction of a significant share of the existing infrastructure of Downtown Manhattan (particularly the World Trade Center complex and part of the World Financial Center), the amount of time required for reconstruction, higher insurance costs, and availability of modern office space and tax incentives in Midtown Manhattan (Pohl, 2004).

An estimated 50% of all security industry jobs (or 100,500 jobs) were located in Lower Manhattan in 2000 (DiNapoli, 2016). Fifteen years later (in 2015) Lower Manhattan's share of the City's securities industry employment declined to 19% (DiNapoli, 2016). In 2015, 33,060 (or 19%) of the 174,000 securities industry jobs in the City were located in Lower Manhattan, while the remaining 140,940 (or 81%) were located in Midtown Manhattan (DiNapoli, 2016). Table 2 presents employment data for NYC's securities industry during the 2000-2016 period.

**Table 2.** NYC Securities Industry Employment, 2000-2016

<b>Year</b>	<b>Jobs</b>	<b>Chg.</b>	<b>% Chg.</b>
2000	200,300	-	-
2001	167,400	-32,900	-16.4%
2002	165,600	-1,800	-1.1%
2003	163,600	-2,000	-1.2%
2004	169,200	5,600	3.4%
2005	176,000	6,800	4.0%
2006	184,300	8,300	4.7%
2007	191,300	7,000	3.8%
2008	182,100	-9,200	-4.8%
2009	164,600	-17,500	-9.6%
2010	169,200	4,600	2.8%
2011	170,900	1,700	1.0%
2012	167,200	-3,700	-2.2%
2013	166,900	-300	-0.2%
2014	170,400	3,500	2.1%
2015	174,000	3,600	2.1%
2016	172,400	-1,600	-0.9%

Source: BLS, 2016; SIFMA, 2017, and authors' calculations.

Employment in the NYC securities industry has declined in absolute terms by 27,900 jobs since 2000, representing a decrease of 13.9% during the 2000-2016 period (Table 2). This trend has been primarily driven by increased competition from other (established and emerging) global financial centers, technological innovation, the high cost of living in NYC, and two major events that have drastically impacted the City's economy in recent years: (1) the September 11, 2001, terrorist attacks, and (2) the 2008 financial crisis (SIFMA, 2017).

The 9/11 terrorist attacks had a major impact on the NYC economy, particularly on its financial services industry (Pohl, 2004). As Table 2 demonstrates, after the 9/11 terrorist attacks, employment in the City's securities industry declined 16.4%, from 200,300 jobs in 2000 to 167,400 jobs in 2001, resulting in a loss of 32,900 jobs by the end of 2001 (Table 2). Job losses continued in 2002 and 2003, with reductions of 1,800 jobs and 2,000 jobs, respectively.

However, starting in 2004, employment in NYC's securities industry began to recover, and the industry added 5,600 jobs in that year (Table 2). In fact, between 2003 and 2008, the City's securities industry added 27,700 new jobs, representing an increase of 17% during this period (Table 2). This remarkable recovery highlights the industry's resiliency as an engine of job creation, and its ability to recover (at least partially) from the devastating effects of the 9/11 terrorist attacks.

The recovery experienced by the City's securities industry after 2004 was abruptly interrupted by the 2008-2009 financial crisis. As Table 2 indicates, the NYC securities industry lost a total of 26,700 jobs between 2008 and 2009; 9,200 of these were lost in 2008, and 17,500 were lost in 2009, which was the worst year in recent history for the City's securities industry in terms of employment. As can be seen on Table 2, employment in the industry fell to 164,600 in 2009, reaching its lowest level during the 2000-2016 period.

Although it remains far below the levels reported in 2000, employment in NYC's securities industry has recovered since 2009. The industry added 4,600 jobs in 2010 and 1,700 jobs in 2011; these gains, however, were offset by losses of 3,700 jobs in 2012, and 300 jobs in 2013, as the industry's profitability worsened (Table 2). According to DiNapoli (2016) as a result of higher capital requirements, legal costs related to the financial crisis, lower revenues, and increased operating expenses, profits in the City's securities industry declined by 40% between 2012 and 2015.

The City's securities industry added 7,100 jobs in 2014 and 2015. As Table 2 shows, this was the first time since the 2008-2009 financial crisis that the industry reported two consecutive years of employment growth. Despite these gains, by the end of 2016, employment in the City's securities industry (172,400) was 10% lower than the figure reported in 2007 (the year before the financial crisis) (Table 2).

## **FUTURE PROSPECTS**

NYC remains the principal financial center in the United States; however, its share of the country's securities industry employment has decreased significantly since 1990. According to DiNapoli (2017), employment in the City's securities industry represented 32% of the total U.S. employment in this sector in 1990. Due to intensive cost reduction, geographic dispersion, technological innovations, and the increased globalization of the financial sector, the City's share of total employment in the U.S. securities industry fell to 20% in 2016 (DiNapoli, 2016).

Even though employment in NYC's securities industry surpasses securities industry employment in other parts of the U.S., by far, the City's position as the country's leader in terms of securities industry employment has been challenged by other states in recent years. The principal factors that have

contributed to this trend include: cost reduction pressures, advances in financial technology (e.g., online trading platforms, the emergence of ROBO financial advisors, etc.), the decentralization of financial services and intermediation, and the cost and tax advantages enjoyed by competing states and locations (Partnership for NYC, 2015; DiNapoli, 2016).

As the U.S. financial sector continues to evolve, declines in employment in the City's securities industry have been offset by increases in employment in competing states (Partnership for NYC, 2015). Compared to the top-ten states with the largest concentration of securities industry jobs, growth in the City's securities industry has lagged behind. Between 2010 and 2015, employment in the U.S. securities industry increased 13% (DiNapoli, 2016). Employment in the City's securities industry grew only by 5% during this period, compared to 50% in Pennsylvania, 33% in Texas, 31% in North Carolina, 16% in California, 13% in Connecticut, and 12% in Florida (DiNapoli, 2016). Only New Jersey and Massachusetts, which reported losses of securities industry jobs of 15% and 1%, respectively, fell behind NYC during the same period (DiNapoli, 2016).

Despite these trends, there are good reasons to remain optimistic about the future outlook (in terms of employment) for NYC's securities industry. As the principal financial center in the United States for the foreseeable future, NYC enjoys many advantages. The majority of the agency and proprietary transactions executed by the City's securities firms are settled in U.S. dollars; the U.S. dollar remains as the world's principal reserve currency, and enjoys relative stability in the foreign exchange (or currency) market. U.S. financial markets are relatively stable, and offer participants relatively low transaction costs, financial transparency, and high levels of efficiency. This increases the City's attractiveness as a global financial hub for both domestic and international investors (Partnership for NYC, 2015).

America's stable political environment, and its business-friendly legal framework and institutions make the City's securities industry (and its overall financial sector) quite attractive for domestic and foreign investors and market participants, and contribute to its prominence as an important center of global finance (Partnership for NYC, 2015). As mentioned earlier, NYC also enjoys several local (and regional) advantages that contribute to its competitiveness and its attractiveness for the securities industry (and the financial sector in general). NYC has one of the largest urban economies in the world, and its residents have the highest income per capita in the United States. The City has direct transportation links with Asia, Europe, Latin America and other parts of the world, as well as with other important regions of the U.S. (Partnership for NYC, 2015).

Finally, the NYC enjoys the concentration (or clustering) of major financial services firms, accounting firms, management consulting companies, advertising firms, law firms, and technology companies that enhance its position as an important center of global finance (Partnership for NYC, 2015). These advantages, combined with NYC's access to an abundant supply of highly-educated, and highly-productive human capital, suggest that despite facing many challenges, the City's securities industry will likely continue to play an important role in the City's economy and its vibrant financial sector.

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## **The Banking Act of 1933: An Examination of the Past and Present**

**Dennis Guh\***

### **ABSTRACT**

During the 2016 election, one of the issues discussed by the candidates from Bernie Sanders to Hilary Clinton and even Donald Trump was whether to reenact the Glass-Steagall Act. The Glass-Steagall Act was four provisions within the Banking Act of 1933. The Act was originally created after the fallout of the Great Depression. It was later repealed in 1999 by President Bill Clinton under the Financial Services Modernization Act of 1999. The objective of this paper is to survey the Glass-Steagall Act from its inception, dissolution and possible resurrection. It is the author's aim to present a general historical background and contemporary dialogue over this regulation. The paper strives to assist both the business law and economics educators when instructing students on the Great Recession of 2008-2010.

### **INTRODUCTION**

In an interview earlier this year, President Donald Trump raised the possibility of resurrecting the Banking Act of 1933. Colloquially termed as the Glass-Steagall Act, it was a law separating consumer lending and investment banking during the Great Depression. (Jacobs, 2017) While a month earlier, United States Senators Elizabeth Warren, John McCain, Maria Cantwell and Angus King introduced a modern version of the Banking Act of 1933 known as the 21<sup>st</sup> Century Glass-Steagall Act to Congress. (Warren, 2017) All this political interest in an eighty-four year old regulation suggests an opportune moment to examine the creation of the Glass-Steagall Act in the 1930s and its eventual destruction in the 1990s.

The rest of this article will proceed as follows. Part I offers the historical context for the establishment of Glass-Steagall Act and its passage during the Great Depression. Part II then offers an overview of the Glass-Steagall Act itself and the financial reform components. Part III describes and examines the reasoning behind its abolishment in the era of deregulation. Finally, Part IV concludes by examining the recent deliberation within the context of financial reforms in the twenty-first century.

### **PART 1. A BRIEF HISTORY OF THE 1920S ECONOMY AND STOCK MARKET**

The transition back to a peacetime economy following the end of World War I was a difficult adjustment for the United States. The post-World War I recession of 1919-20 even though extremely brief was considered moderately severe. (NBER, 2012) The end of war time production and returning troops contributed to high unemployment and decline in wages with factories becoming idle. This was further exacerbated by resumption of normal European agricultural production, which lower the demand for American production. Farm prices fell at a catastrophic rate. The price of wheat, the staple crop of the Great Plains, fell by almost half while cotton prices in the South, fell by three-quarters. (Romer, 1988)

By the beginning of 1921, the United States had successfully transitioned to a peacetime economy especially in the metropolitan centers. (Miller, 2015) The period from 1921 to 1929 would come to be

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nicknamed “the Roaring Twenties,” a term coined by the famous author, F. Scott Fitzgerald. This captures the sense of prosperity and excitement as America gained dominance in world finance. (Soule, 1948) The United States would become the richest country in the world per capita and the largest total GDP. (Goldberg, 2003) The annual GNP grew at a rate of 4.7 percent from 1922 to 1929. (US DC, 1975)

The migration from rural America into major urban centers increased dramatically as farmers, many of whom had taken out loans to increase production, failed to make payments due to limited demand and excess supplies. With agricultural incomes remaining stagnant, farm foreclosures and rural bank failures increased at an alarming rate. While the major metropolitan cities were experiencing a renaissance with the growth of industries such as automotive, film, radio and chemical. New technological innovation like mass production and assembly-line accelerated demand for labor and real wages increased by around 20%. (Goldberg, 2003) Combining the rising wages with the falling cost of new mass produced goods allowed the middle-classes in urban centers to experience luxuries previously unattainable prior to World War I. The best example of this is the automobile. The Model T sold for \$850 in 1908, now sold for \$290 in 1924, the rate of automobile ownership increased from one car per fifteen Americans to one car per five Americans. (Allen, 1931)

The financial needs of these new industries altered the face of American capital markets. In the 1800s, commercial banks were severely limited in their ability to provide large long-term loans due to regulations. These restrictions prohibited National Banks from lending to one customer more than 10 percent of their capital and surplus. The effect of this regulation on banks’ lending capacity was amplified by strict state limits on branch banking that restricted banks’ ability to grow. Corporations turned to financing their capital investments out of retained earnings, bond and stock issues. The market for industrial securities, which first emerged in the nineteenth century, came of age in the 1920s, as both old and new firms issued equities to finance new plant and equipment. (Campbell, 1988)

Commercial banks did purchase more bonds, but they could not legally trade or acquire equities. To bypass these regulations, they developed the “affiliate system” which was a process of setting up independent but fully owned affiliates under state charters. This sanctioned them to penetrate all aspects of investment banking and the brokerage business. The number of affiliates grew rapidly from ten in 1922 to one hundred and fourteen by 1931. (White, 1986) These affiliates solicited many new customers and became a major distributor of stock and bonds, empowering them to become underwriters. By 1930, commercial banks’ security affiliates had obtained roughly half the bond originations. By moving into investment banking through their affiliates, commercial banks were thus able to continue servicing the requirements of their corporate customers (White, 1986)

While the securities affiliates catered to a broader clientele than most traditional brokerage houses, many small investors might still have shied away from buying securities, lacking sufficient capital to purchase a diversified portfolio of stocks. This obstacle was eliminated by the investment trusts, which served the same function as mutual funds do today. The investment trusts grew from about forty in 1921 to over seven hundred and fifty by 1929. Investment trusts were primarily institutions that sold securities to

the public and used the proceeds to invest in stocks and bonds. There were two main types of investment trusts, management trusts and fixed trusts. The management trusts had managers overseeing the portfolio and making business decisions. The fixed trust, on the other hand, the portfolio could not be changed from its initial inception. (West, 1977)

The growth of the securities market, assisted by the establishment of investment trusts and securities affiliates, allowed firms to substitute stocks and bonds for commercial bank loans. This development began well before the stock market boom, but the pace of change accelerated in the 1920s with the rapid growth of modern industrial enterprise. During this decade, banks found their traditional role as intermediaries sharply reduced. Commercial loans as a percentage of total earning asset of national banks fell from fifty-eight percent in 1920 to thirty-seven percent in 1929. In response, they sought to increase their fee income by offering new financial services, including trusts and insurance. (West, 1977) Most importantly, they increased their role as brokers between the saving public and industry. Banks were familiar with their borrowers and conditioned to monitor their activities. However, the overall sophistication of investors was weakened by the influx of new people into the market. Even before the boom began, many people who had never bought stock before entered the market. One major group of new investors was women, whom brokers catered to with special programs and even their own rooms to watch the ticker tape. All these new investors lacked experience in buying stock and monitoring firms. , thus creating a favorable condition for the later crash in 1930. During 1921 the Dow Jones Industrial Average was at around 16 points, but by September 3, 1929, the Dow Jones Industrial Average swelled to a record high of 381.17, reaching the end of an eight year growth period during which its value ballooned by a factor of six. (US DC, 1975)

Another contributor to the economic boom was easy credit. When an investor bought stock on margin, his broker usually paid the difference by contracting a broker's loan from a bank that was collateralized by the stock. Call loans were the most important type of brokers' loans. These loans had a daily call option and floating interest rate. Of lesser importance were time loans that had fixed maturity and fixed interest rate. (Patterson, 1965) The stock market credit was key element in generating irrational euphoria. This mania led individuals and institutions to believe that all will be better, that they are meant to be richer and to dismiss as intellectually deficient what is in conflict with that conviction. The ability to purchase stock on margin was a great speculative lure. A buyer need only to provide a fraction of the required funds, borrow the rest and enjoy the full capital gain less the interest on the borrowed money. This only further fueled unwise speculation for the public.

The Federal Reserve started to pursue a contractionary policy beginning in January 1928, with open market sales and a rise in the discount rate from three and half percent to five percent. In 1928 and 1929, the consumer price index fell and M1 grew only slightly. (Patterson, 1965) These policy was a consequence of its fears about the flow of credit to the stock market. The Federal Reserve had always been concerned about excessive credit for speculation. The Board wanted member banks making loans on securities to be denied access to the discount window in order to force credit away from speculation. By 1929, the brokers' loan did not slow down but grew rapidly even though member banks' loans to brokers was in sharp decline.

The rapid growth occurred in loans from private investors, corporations and foreign banks in Europe and Japan, which quickly substituted for bank loans. (Patterson, 1965)

Brokers' loans did not contribute to the stock market boom. Instead, the demand for credit to buy stock pulled funds into the market, forcing major reallocation of credit in the money and capital markets. The stock market boom also had a powerful effect on the demand for money due to the demand for transactions balances to buy stocks. This caused money markets to tighten further as the boom progressed, misleading the Federal Reserve as to the actual effect of its policies. As the call rate rose, there was a rapid decline in commercial paper. Commercial banks provided more loans and discounts to firms that had previously relied on the commercial paper market. (Patterson, 1965) The stock market demand for funds and new issues forced major changes in other financial markets. The growth in the new issues of domestic stock increased dramatically, while issues of domestic bonds and notes fell from \$3.1 billion in 1927 to \$2 billion in 1929 and foreign securities fell even more from \$1.3 billion to \$673 million. (Patterson, 1965)

The stock market started to unravel on Wednesday October 23, 1929 to the close on Tuesday October 29, 1929, the New York Stock Exchange lost over twenty-five percent of its value. In that single week, the Dow Jones Industrial Average (Pierce, 1982) fell from 326.51 to 230.07, a drop of twenty-nine and half percent, while the Standard and Poor's composite portfolio of ninety stocks (Schwert, 1990) fell from 28.27 to 20.43, a fall of twenty-seven and eight percent. As large as these drops were, they must be placed in the proper perspective. First, at the end of 1929, stock prices were less than twenty percent below their beginning of year level, and well above the level at the beginning of 1928. In addition, much of the October 1929 loss was regained by mid-April of 1930. But, nevertheless, it is important to keep in mind that the October 1929 crash was just one part of the sustained decline that began on September 3, 1929, when the Dow Jones Industrials closed at 381.17, and continued through the end of February of 1933, when Dow closed at 50.16 which was a cumulative decline of over eighty-five percent. While share prices certainly fell in late October 1929, and trading was disorderly in many respects, the market decline was more gradual and much longer than the term 'crash' implies. Finally, it is worth noting that the Dow Jones Industrial Average did not reach the nominal level of the September 1929 peak again until the mid-1950s.

In the immediate aftermath of the crash, President Herbert Hoover instructed Congress to investigate the prospect of separating commercial and investment banking. (Kelly, 1985) Senator Carter Glass spearheaded the effort in the Senate to devise new regulations, introducing early draft legislation in 1930, and holding hearings under the authority of the Senate Banking and Currency Committee in early 1931. (Kelly, 1985) In January 1932, Senator Glass introduced a revised bill that for the first time was specifically designed to separate securities affiliates from commercial banks. The financial sector was strongly opposed to the legislation fearing the pending legislation as unfairly restrictive of banking practices, and a threat to the prospects for economic recovery. On April 19, 1932 Senator Glass introduced the final version of this bill. The bill focused on securities affiliates as the key catalyst for the collapse of the financial sector, proposing the outright separation of commercial from investment banking. But President Hoover and much of Congress remained opposed to major financial regulatory reform, delaying further action on the bill.

As 1932 wore on, the prospects for Senate Glass's bill seemed to improve. The public hearings into stock exchange practices revealed the excesses of Wall Street bonuses, income tax evasion, and highly profitable but misrepresented securities sales and other problematic business practices. The bill received a further boost when Senate Glass helped with the drafting of Franklin D. Roosevelt's Democratic Party platform in 1932. He was able to insert a provision calling for the regulation and separation of commercial and investment banking. (Perkins, 1971) Throughout the spring and summer of 1932, banks and influential business groups continued to oppose the bill, meeting with members of Congress and criticizing the bill as harmful to credit, recovery and growth in the midst of the depression to the public. After Franklin D. Roosevelt's electoral victory, even President Hoover came around to supporting a version of the bill realizing financial regulation of some kind was now inevitable. President Hoover with the help of a Republican Senate hoped to obtain passage of a more watered down version of the bill before Franklin D. Roosevelt and the newly elected Democratic Congress could be sworn in. (Perkins, 1971) They were unsuccessful in achieving passage in the Democratic House, where debate was already beginning on the prospect for deposit insurance called the Steagall's deposit insurance bill. With the arrival of a new Congress and a new administration in March 1933, the Glass bill moved very quickly toward passage. Much of the "Hundred Days" session of Congress centered on bolstering the economy and staving off further financial collapse. Eventually, the Glass bill and Steagall's deposit insurance bill would merge and secure bipartisan support for passage in the House. (Kelly, 1985)

## **PART 2. AN OVERVIEW OF THE GLASS-STEAGALL ACT**

The Glass-Steagall Act consisted of four provisions: sixteen, twenty, twenty-one, thirty-two, which taken together mandated the separation of commercial and investment banking. Provisions sixteen and twenty prevented any bank that accepts deposits from directly engaging in most securities activities except for those involving municipal general obligation bonds, United States government bonds, private placements of commercial paper and real estate bonds. Provisions twenty-one and thirty-two address indirect securities activities through bank subsidiaries or affiliates and apply to banks that are members of the Federal Reserve System. Provision twenty prohibits these banks from affiliating with any organization "engaged principally" in underwriting securities, and Provision thirty-two prohibits director, officer or employee interlocks between these banks and firms "primarily engaged" in securities activities. The banking act also expanded permission for national banks to engage in "branch banking" by opening subsidiary branches in different localities and expanded the regulatory powers of the Federal Reserve. It will also create a deposit insurance system by establishing what is now known as the Federal Deposit Insurance Corporation. (12 U.S.C. §24)

As a substantive policy, the Glass-Steagall Act's separation of commercial and investment banking was seen as crucial to preventing abuse by financial firms in selling securities. A commercial bank might promote the securities it underwrites and misrepresent the quality of these securities to its depositors instead of offering them disinterested investment advice. Or the bank might induce a troubled loan customer to issue new securities to repay the loan. If investors in these securities are naïve, they are penalized by purchasing

poor quality securities believing they are good investments. If, however, investors are not naïve, they know such a conflict of interest might exist and will, therefore, adjust down the price they are willing to pay for such securities. In this case, the issuing firms that use commercial bank underwriters bear the cost by receiving less funding than they would like, so there is underinvestment. The economy is worse off, since some good investments go unfunded.

### **PART 3. The ABOLISHMENT OF THE GLASS-STEAGALL ACT**

During the 1980s and 1990s, federal banking agencies and courts adopted creative statutory interpretations that enabled banks to engage in stock markets activities and allowed nonbank financial institutions to offer substitutes for deposits. The collective impact of those rulings eroded Glass-Steagall barriers by permitting commercial banks to behave more like securities firms and allowing nonbanking financial institutions to behave more like banks. (Markham, 2000)

Federal agencies and courts was able to undercut Glass-Steagall in three significant ways. First, nonbank financial institutions were allowed to fund their operations by offering short-term financial instruments that were redeemable at par and served as functional substitutes for deposits. Those instruments included money market mutual funds, commercial paper, and securities repurchase agreements. The largest commercial banks also began to rely significantly on these type of instruments after they were allowed to reestablish securities affiliates beginning in 1987. (Markham, 2000)

Second, banks received permission to convert their consumer and commercial loans into asset-backed securities through the process of securitization. Third, banks gained authority to become dealers in over-the-counter derivatives, which provided synthetic substitutes for securities, exchange-traded options and futures. (Whitehead, 2010)

The National banks were not satisfied with the limited victories they achieved by opening loopholes in Glass-Steagall. They lobbied and launched a prolonged campaign in the 1980s and 1990s to repeal Glass-Steagall's provisions. In 1991, the U.S. Treasury Department issued a landmark report, which called for the removal of state banking restrictions on interstate banking as well as the repeal of Glass-Steagall. Congress adopted Treasury's plan by enacting the Riegle-Neal Interstate Banking and Branching Efficiency Act, which allow nationwide banking and branching. In 1998, with the merger between Travelers, a large insurance and securities conglomerate, and Citicorp, the largest U.S. bank to create Citigroup created the first "universal bank" to operate in United States since 1930s. (Whitehead, 2010) Thus exerting extreme pressure on Congress to repeal the Glass-Steagall's anti-affiliation rule.

Citigroup and other large financial institutions began a massive lobbying campaign that finally persuaded Congress and President Bill Clinton to adopt the Gramm-Leach-Bliley Act in 1999. This act authorized the creation of financial holding companies that could own banks, securities firms and insurance companies and finally repealed Glass-Steagall Act. (Sissoko, 2017)

#### **PART 4. GLASS-STEAGALL ACT IN THE TWENTY-FIRST CENTURY**

In the fall of 2008, the United States experienced a sudden financial crisis that plunged the financial sector into the worst economic downturn since the Great Depression. The large banks originated subprime mortgage and sold them to their depositors as securities. As home prices declined, mortgage delinquencies and foreclosures increased causing a devaluation of subprime mortgage securities. (Taub, 2014)

In the aftermath, President Barack Obama introduced a series of regulatory proposals to address the Great Recession of 2008-2010. Discussion about Glass-Steagall started to take shape both in public and private sectors. (Wack, 2012) This crystalized into reality during the 2016 Presidential election with both the Democrat and Republican platforms signaling possible reinstatement of Glass-Steagall.

In 2013, Democratic Senator Elizabeth Warren and Republican Senator John McCain proposed a bipartisan bill, the 21<sup>st</sup> Century Glass-Steagall Act, which would reinstate the Glass-Steagall Act. (Warren, 2017) After winning the 2016 election, the Trump administration is open to implementing legislation that would function to reinstate the provisions of Glass-Steagall. But in a hearing before the Senate Banking Committee on May 18, 2017, Treasury Secretary Mnuchin clashed with Senator Warren, saying that the Trump administration does not support a full separation of banks and investment banks. (Bryan, 2017)

In conclusion, in light of the lively debate in Washington and further developments in this area are likely to continue. The financial services industry faces the real possibility of a bipartisan effort to pursue a number of possible approaches to reinstating the portions of the Glass-Steagall Act that separated commercial and investment banking. Such legislation could have a profound impact not only on banks but potentially on many other types of business within the financial industry.

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## FinTech, Information Disclosure and Regulation

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### Abstract:

Internet Technology tremendously decreased the fixed cost of financial transactions, however, the access of Internet technology lowered financing deceivers' cost as well. Therefore, based on Spence (1973)'s signalling model, we mainly discussed whether or not the Internet efficiently increased the preciseness of information transmission in the financial market, and lowered the total cost of financial transactions especially with the lower cost of information disclosure. We found that if the investors follow the standard of information disclosure formed during the time without the Internet to make investments, bad projects would be invested in and the expected earnings would be lower than zero; simultaneously, as the distinction between two types of projects' marginal costs of information disclosure lowers, the total social welfare with best level of information disclosure is much lower than the one without Internet. It means that the use of Internet technology in the financial market does not effectively lower the total cost and in contrast, damages social welfare. In addition, when the market risk grows (good projects are scarce), the only way to increase the social welfare with the best level of information disclosure is to enlarge the differences in marginal cost of information disclosure between good and bad projects. Therefore, we need to perfect our regulations and legal institutions to enlarge the difference in marginal costs of information disclosure between good and bad projects in the market, thus finally increasing the efficiency of investment.

### 1. INTRODUCTION

Internet Technology tremendously decreased the fixed cost of financial transactions, thus improving liquidity in financial markets in an unprecedented way. Through the big data Internet financial information system, mobile Internet and cloud computing technology greatly reduced the financial cost of infrastructure, and by reducing the information acquisition, processing and transmission costs, they further reduced the cost of disclosure of information, which enables the standardization of information based on (i.e., credit scoring and grading) complex asset securitization and multistage-derivative financial transaction as possible, to promote the prosperity and development of the financial market.

However, Internet technology also reduced the cost of financing fraud. Once the supervision and legal systems stop existing, it will form a huge credit risk, resulting in a big loss of investors. For instance, cybercrime is the top one threat in today's business world, costing more than \$400 billion a year. Global internet attacks hit a new high in the first quarter of 2017, more than 130 million hits, which is faster than the growth rate in 2016. In 2016, for the UK, Cifas, a fraud database and insider fraud database of the British financial crime prevention and anti-fraud nonprofit institution, recorded a total of 325,000 fraud records. This agency prevents more than 1 billion pounds of losses. Additionally, in 2016, the number of the world's major data disclosure is up to 980, of which 60% from mobile-device fraud, an increase of 170%

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compared to the same period last year. Moreover, CNNIC (China Internet Network Information Center) data shows that in 2016, 70.5% of Internet users encountered a problem with network security, which is the first online fraud network security problem users have encountered. 39.1% of Internet users have encountered this type of network security incidents (Caixin, 2017)

There is serious information asymmetric in the financial market to consumers in a weak position in resources, professional ability and other aspects compared to financial institutions. FinTech also covers a large part of the small enterprises and relatively low income groups with little financial expertise and the low risk tolerance are neglected by the traditional financial system.

Since large number of FinTech is emerging, the risks and challenges of financial development lie in the following aspects: at first, in the context of FinTech, a large amount of data cannot be accessed by the regulators, who may conduct data fraud, false data, data leakage and a series of security problems. Some data and databases have been malicious attacked, which has been gradually exposed to society. The data security of financial transactions has been under a certain degree of threat. Also, the lack of information disclosure leads to the credit risk caused by asymmetric information. Many events in reality, such as running away with money, are conducted by the improper information disclosure; the regulators cannot discover the existence of information disclosure problems immediately; therefore, it brings great loss to the investors and also bring bad influence to the reputation of the industry. Third, the existing legal rules do not have a clear definition of intelligence contracts and whether such contract is applicable based on "contract law". Academia does not define it, either. The emergence of those disputes will be difficult to make a qualitative and accurate regulation. This compliance risk is also one of the important risks in the context of financial technology development. Fourthly, cross industry and cross-border financial risks will bring instability. With the development of mixed operation, the transaction frictions between different types of markets decrease, and the different regulatory rules of different industries will lead to the uncertainty of legal application, thus increasing the cost of legal regulation (Yang, 2017). More importantly, released in 2017, "A Framework for FinTech" sets forth 10 overarching principles that constitute an outline that policymakers and regulators can use to think about, engage with, and assess the FinTech ecosystem in order to meet these policy objectives. Some of them are related to the regulation of information disclosure. Fintech companies should build products and services that take into account full compliance with consumer protection (and all relevant) laws and regulations from the outset. Further, they should start with and maintain robust compliance systems to ensure that, as they grow, consumer protection develops as a natural part of their products' DNA. Increasing access to the financial system must be done safely so as to enhance overall financial health. Technologically-enabled products and services have the ability to provide broader access to basic financial services, expand access to credit to responsible borrowers, help consumers manage wealth, improve student loan financing, facilitate remittance payments, assist consumers in financial decision-making, and much more. As FinTech companies invent and reinvent financial tools, they should seek to do so in a way that is simple, clear, and transparent. Transparency should occur on several levels. FinTech companies must promote transparency with their customers. Transparency also is important when

engaging with regulators or other appropriate authorities. Regulators and government officials should likewise be appropriately transparent about their practices and objectives, as it is important for policymakers and regulators to help the industry better understand the government's perspective (National Economic Council, 2017). Therefore, the information disclosure system is critical to risk prevention and control and consumer protection.

Therefore, a study on the Internet financial transaction technology to reduce fixed costs, especially the cost of information disclosure under the premise, researched whether the financial market can effectively improve the signal transmission accuracy and whether it can reduce the total cost of financial transactions. Research shows that after the implementation of information disclosure of the marginal cost of declining Internet technology, if investors not to join the Internet technology in accordance with the information disclosure standards for screening of investment projects, investment projects will lead to bad. The expected investment returns are less than zero. At the same time, the optimal level of information disclosure of the total social welfare is far lower than that of having Internet technology be excluded from the total social welfare, which indicates that the use of Internet technology in the financial lending in the market did not reduce the total transaction costs but damage to the social welfare.

## **2. LITERATURE REVIEW**

FinTech means financial technology, which is a combination of "finance" and "technology" through the information technology innovation and its promotion to the financial services to enhance financial business and reduce the financial services costs (Menat, 2016). Philippon (2016) argues that the completed combination result is often technology-enabled financial business models in all subdivided fields of finance (Philippon, Thomas. 2016). According to Arner, Barberis, and Buckley (2016), there have been 3 history stages for the development of FinTech. The first stage was the first time of connection between information technology and finance in 1970s and 1980s, which brought about the electronic accounting to replace the manual accounting and improved information transmission efficiency. The second history stage was the process of digitization of finance that opened up the network virtual space for the transmission of information since the 19th century. And with the development of social media, the mobile Internet and the gradually improved magnitude of the data since 2008, the third history stage was the finance intellectualization and datamation system that introduced technology to provide excellent quantitative analysis techniques and tools, thus making financial decisions more scientific and bring about many new financial business models. Those pioneering financial business models included network credit and loan, network financial investment and management, network consumer finance and crowd funding.

Up until now, Ginsel (2016) claims that, the true concept of FinTech after the long period of development are more rooted in the advanced technologies improving finance efficiency. Depending on the technologies of artificial intelligence and large data, and the advantage of Internet on the information exchange and the connectivity, FinTech is able to lower costs and facilitate access to financial products and markets to cover more consumer groups and more financial investment products and services (Dapp, 2014). Once before,

consumer credit, private financial management, equity financing and others alike were merely related to wealthy individuals (Joseph, 2016). However, at present, middle income consumers are benefiting from the lending platform, the loan repayment situation is relatively stable, and the social unemployment rate is consistently declining. FinTech definitely creates more jobs and employment opportunities, which is beneficial to the whole society (Steeves, 2016). What's more, a majority of investors hold that the application of large scale, artificial intelligence, and machine learning into intelligent machine algorithm provides efficient and quick financial advice and improves products choices for them (Preece, 2016). According to his analysis on the block chain connection, Gandhi (2016) states that the application of block chain mechanism into trading values, equities and commodities is closely associated with the drastically reduced costs and the facilitation of the realistic financial practices to the responding and limitless ecosystem. He et al. (2017) insists that the application of cloud computing minimizes asymmetric information and provides convenience for the matching of all parties to a transaction of lower the business costs.

However, the integration of information technology and finance, both of high risk, establishes an even riskier area of interest. Firstly, for the whole financial system, FinTech does not change the original risk attributes and types of traditional financial business by still having traditional credit risk, liquidity risk, interest rate risk and reputation risk still existing within FinTech businesses. Secondly, compared to traditional financial institutions and intermediaries, the loan default of borrowers for FinTech companies are more frequent. According to Grut (2016), since the barrier to entry for FinTech is relatively low, FinTech start-ups can just profit depending on the support by the financial teat of venture capital money and without any real technical innovation. But the business profiting model is not sustainable because higher interest rates charged on the high-risk borrowers can not compensate for their loan default since the P2P network borrowing lacks complete credit cycle data accumulation and the accuracy of credit risk model based on large data technology and existing algorithms needs to be tested (Emekter et al., 2015). So besides the credit grading evaluated by the FinTech start-ups, more other information is required to improve the accuracy in predicting default and achieve sustainable development (Serrano, Gutiérrez & López, 2015). In fact, the profitability of FinTech start-ups is not certain and the overall business ability and the corporate ethics are not guaranteed. At the beginning of 2016, due to 22 million US dollars of illegal sale of loans, CEO of Lending Club resigned and the stock price once fell close to 50%, triggering industry collapse with much impact on OnDeck Capital, Prosper and other famous P2P platforms. In addition, FinTech's business development is based on "network effects" and "economies of scale", and once the risks erupt, these effects may in turn amplify the risk and thus the risk control and disposal are more difficult. Thirdly, investors gradually avoid devoting much time? money? Clarify on FinTech and the investment of investors is exerting negative impacts on the industry. According to KPMG (2017), the total investment in FinTech declined from 46.7 billion US dollars in 2015 to 24.7 billion US dollars in 2016, which shows the global investors' lack of confidence in FinTech. As stated by Gilroy (2017), facing the unmanageable long return on investment, the investors fear that their money will be greatly be spent on premise (KPMG, 2017). So the reality of the

market and the requirements of investors force FinTech companies to focus more on traditional sales capacity than data and technical capabilities. The investment in FinTech is for business to grow rapidly rather than for innovation. This, in turn, leads to the pursuit of short-term goals in FinTech industry. Also, the gradually complex governance regulations are the other barrier for the investors. What's more is that many people are worried about the privacy of consumers' personal information and data and the system security.

When targeting on the risks of FinTech development, the governance and regulations are key and decide how far this industry will go. The regulation spirit is encouraging responsible innovation of FinTech as well as effectively balancing financing efficiency and protecting consumers' safety and benefits. For example, Financial Conduct Authority (FCA) in the UK launched the "Regulatory Sandbox" in November 2015, which aims at encouraging innovation while setting limits on the market range of innovative businesses to ensure that the impact of risk and failure of innovation is controlled. Comptroller of the Currency (OCC) in USA issued a white paper in March 2016 to support "Responsible Innovation", which means "the use of new or improving financial products, services and processes to meet the needs of consumers, enterprises and communities in compliance with the sound risk management and the overall banking strategy (Office of the Comptroller of the Currency, 2016)." At the same time, OCC guided the FinTech start-ups to carry out "responsible innovation". According to the eight basic principles, OCC supported responsible innovation, encouraged inclusive financial innovation, promoted secure operation through effective risk management and encouraged banks to incorporate responsible innovation into strategic planning. For example, according to the functional attributes of all kinds of FinTech businesses, the certificates sold by P2P platforms will be identified as "Notes" and P2P platforms are mainly supervised by the US Securities and Exchange Commission (SEC) according to the securities laws. P2P platforms shall apply to be registered in the SEC (Chaffee and Rapp, 2012). Investors are required to enter only by registering and being qualified as eligible investors by SEC. The above provisions are to ensure the safety and efficiency of financial markets. For example, in the future, governors and regulators will actively use information technology innovation such as large data, cloud computing, automated procedures, block chain, distributed books and other technological innovation to develop a real-time data integration system, automated monitoring, and a reporting system that improves the risk dynamic monitoring and the risk early warning system (Duchamp, 2016).

Information disclosure is the core of the regulation to improve the protection mechanism of financial consumers' rights and interests, including strengthening the information disclosure system and improving the complaints handling mechanism for the consumers. English and Hammond (2017) states that the FinTech start-ups are required to carry out their obligations of providing the necessary and adequate information, so that the financial consumers are fully aware of the risks and benefits of investment products and businesses. The regulatory authorities have asked FinTech companies to publish consumer privacy protection system and formulated corresponding punishment measures on the irregularities to strengthen the consumers' private information protection. Consumer Financial Protection Bureau (CFPB) issued *Policy*

*on No-Action Letters*, which required the innovative FinTech companies to let consumers to fully understand their products, terms, characteristics, costs, values and risks and disclose information on what kind of safeguards policies companies will provide for consumers to reduce the risk. Besides being regulated by SEC, the P2P platforms are under the supervision of CFPB and Federal Trade Commission (FTC). While CFPB is responsible for collecting data on P2P consumer complaints. And FTC is responsible for overseeing and preventing the unfairness and fraud of the P2P platforms on the aspect of law enforcement.

As to the importance of information disclosure regulations, there are asymmetric information in the financial market with consumers who have a weaker position when it comes to having resources, professional ability and other aspects in comparison to those financial institutions. And Fintech covers a large part of the small enterprises and relatively low income groups with little financial expertise and the low risk tolerance who are neglected by traditional financial system (Darolles, 2016). Therefore, the information disclosure system is critical to risk prevention and control and consumer protection. As to the effect and conditions of information disclosure regulation, Lee and Lee (2012) admit that information disclosure to some extent avoids herding behaviour in online P2P lending while Lin, Prabhala, and Viswanathan insist that sufficient information disclosure and transfer are helpful to building online friendships for borrowers on online P2P lending market in order to reach the success of transaction (Lin, Mingfeng, et al. 2012). Brealey, Leland & Pyle (2012) state that since the disclosure rules, information on project investment quality would serve as the market signal and signalling incurred welfare costs by guiding entrepreneurs to occupy greater stake in their own companies if information could be directly transferred. As to the barriers of information disclosure, Fenwick, McCahery & Vermeulen (2017) focus on the investors' perception and investment for FinTech and examines the effect of information disclosure regulations on the investment changes of Fintech. Yan, Yu & Zhao (2015) discuss the reason and manifestation of information asymmetry in financial market using the theories of signalling and search costs and put forward some suggestions on how to solve the problem of information asymmetry especially in FinTech business of P2P lending.

Although this paper also focuses on the barriers of information disclosure regulation, this paper specifically examines the new and more stringent requirements of the changes in the cost of disclosure of information on the information regulation. By integrating with the signalling model and quantitative analysis, the paper recovers that after Internet technology achieves the declined marginal cost of information disclosure, in case the investors invest according to the information disclosure standard of screening projects without Internet technology, the bad projects will be invested and the expected return on investment will be less than zero. And the total social welfare at the level of optimal information disclosure will be much lower than the total social welfare without Internet technology, indicating that the use of information technology in the financial lending market will not effectively reduce the total transaction costs and may undermine the social welfare. And finally, the paper explores recommendations for regulatory innovation upgrades including information disclosure regulation to further improve FinTech.

### 3. MODEL

#### 3.1 PREFERENCE AND TECHNOLOGY

Considering a borrowing market made up of investors and borrowers, all participants are neutral-risky orient, and the market is fully competitive. There are two types of borrowers in the market, one is the good borrower who will pay the investor's income after the success of the project. One is the bad borrower who belongs to the fraud. For the sake of simplicity, we consider the borrower to have only one way of financing: to choose to borrow money from investors for project financing. As an advantage of information, borrowers can choose to disclose certain information to investors to obtain funds. Investors have funds ( $I$ ), for simplification, we assume it to be standardized to 1. There are two options for investors: one is to choose the market to invest the project in to obtain income, the rate of return  $r_i$ ; the second is to choose the funds deposited in the bank to obtain a fixed income, risk-free interest rate  $r_0$ . According to the signal model of Spence (1973), there is an adverse selection between these two options.

#### BORROWER

Consider the existence of two types of borrowers in the market, the proportion of good borrowers( $\alpha$ )and the proportion of bad borrowers( $1 - \alpha$ ). Good borrowers are sure to give investors a return on their success, and their benefits depend largely on the type of project and the success of the project; bad borrowers are purely fraudulent, taking into account how the bad borrowers will be part of the funds invested in the project (the project's income is usually 0), so that the proceeds meet  $\beta < \beta < 1$ .

#### PROJECT

Naturally, it determines the type( $\theta$ ) of project a borrower has, it may be a good project ( $G$ ) or a bad item ( $B$ ). For simplicity, assuming good borrowers have good items, and bad borrowers have items that are bad items, the probability is  $\alpha$ .

The key to the success of the project is the availability of financial support, which depends to a large extent on the delivery of capital markets. For more information on the projects, we can get adequate financial support ( $I$ ), so there is a great possibility of success; for less information on the project, we cannot get financial support, so there is a great possibility of failure. After obtaining financial support, the probability of good project success is  $P_G$ , after the success of the yield  $r_G$ , which  $(1 + r_G) = R_G$ ,  $r_G > r_i$ , after the failure of the proceeds of 0; no funds to support the project and the success of the bad project probability  $P_B = 0$ , the income is 0.

#### 3.2 TIMING

The game timeline is shown in Figure 1. In the first stage, the borrower determines the level of information disclosure based on the cost of information disclosure, and the level of information disclosure mainly refers to the quality of the disclosure. In the second stage, the borrower understands the level of information disclosure which represents the amount or the quality of information disclosure. In the third



Furthermore, the two types of projects do not disclose information. When there is asymmetric information in the market, the income and social welfare of the two borrowers are:

$$R_G^n = P_G \times (r_G - r_i) \quad (2)$$

$$R_B^n = \beta \quad (3)$$

$$SW_n = \alpha \times R_G^n + (1 - \alpha) \times R_L^n \quad (4)$$

Among them,  $R_G^n$  is good borrower income;  $R_B^n$  is the loss of social welfare caused by fraud;  $SW_n$  is the social welfare when two types of borrowers do not disclose the information, consisting of two types of borrowers and investors expected revenue income composition.

If the two types of projects are information disclosure, there is still information asymmetry in the market since no one can find the good projects merely depending on their information disclosure. Therefore, the investor income, two types of borrowers' income and social benefits are:

$$R_L^y = \alpha \times P_G \times (1 + r_i) - (1 + r_0) \quad (5)$$

$$R_G^y = P_G \times (r_G - r_i) - c_G d \quad (6)$$

$$R_B^y = \beta - c_B d \quad (7)$$

$$SW_y = \alpha \times R_G^y + (1 - \alpha) \times R_B^y + R_L^y \quad (8)$$

$R_L^y$  is the investors return when two types of projects are for information disclosure; and  $R_G^n$  and  $R_B^n$  represent the good borrowers' and bad borrowers' income respectively when the project disclosure level is achieved at the same;  $SW_y$  is the social welfare when two types of borrowers are the information disclosure.

### 3.4 CONTRACTS

In the signal model of Spence (1973), there is a separation equilibrium and a pooling equilibrium. Because in the pooling equilibrium, the investment yields are zero or negative, so in the loan market, we only study the separation equilibrium. When the separating equilibrium occurs when different types of signals have one advantage that borrowers, the optimal level of the selected signals can be observed is different, so the information is a disadvantage that investors can through the index to distinguish between different types of information has the advantage of a party. In a lending market, if the investor is able to rely on one signal to differentiate between different types of borrowers (or items), then the separation equilibrium is achieved.

So we have:

$$R_L^1 = P_G \times (1 + r_i) - (1 + r_0) \quad (9)$$

$$R_G^1 = P_G \times (r_G - r_i) - c_G d \quad (10)$$

$$SW_1 = P_G \times R_G - c_G d \quad (11)$$

$$s. t. \quad (1) \quad P_G \times (r_G - r_i) - c_G d > 0$$

$$(2) \quad \beta - c_B d \leq 0$$

$R_L^1$  is the investor income only when a good project information disclosure;  $R_G^1$  is the borrower's income when information disclosure of the good project reaches the level of  $d$ ;  $SW_1$  is the social welfare. For a given

level of information disclosure, constraints (1) said good project information disclosure after good borrowers' income is better than not disclosed before the constraints (2) said the bad project information disclosure after bad borrowers income is lower than the nondisclosure before, so as to reach the equilibrium separation. According to the two constraints, we obtain:

Lemma 1: there exists  $\bar{d}$  and  $\underline{d}$ , when  $\underline{d} \leq d < \bar{d}$ , good project will make the information disclosure, in order to obtain sufficient investment; bad items do not disclose information and cannot obtain investment.

Therefore, investors can make corresponding contracts that set information disclosure levels to identify different types of borrowers (or projects) to achieve separation equilibrium.

## 2.5 INCENTIVE COMPATIBILITY

In the separation equilibrium, according to Lemma 1, we have:

$$\begin{aligned} & \max_d [P_G \times (r_G - r_i) - c_G d] \\ & s. t. \frac{\beta}{c_B} \leq d < \frac{P_G(r_G - r_i)}{c_G} \end{aligned}$$

Therefore, we can draw the proposition 1, the following propositions provide the optimal disclosure level of the borrower's earnings maximization:

Proposition 1: there exists  $d^*$ , the bad project will not make the information disclosure, the expected borrower return is maximize, at this time, the level of information disclosure for the project is  $d^* = \frac{\beta}{c_B}$ , the level of information disclosure of the bad project is  $d_0 = 0$ .

Further, consider the impact of information disclosure levels on social welfare and investor returns. At that time, when  $d < \frac{\beta}{c_B}$ , since the total cost of information disclosure is small,  $c_B$  the borrowers will disclose information about the two types of project and the market will still be information asymmetry. At this point, the social welfare:

$$SW_y = -[\alpha c_G + (1 - \alpha)c_B]d + \alpha \times P_G \times R_G + (1 - \alpha) \times \beta - (1 + r_0)$$

Considering the full competition in the market, the expected return of the borrower is zero, and the yield of the investor is:

$$r_i^y = \frac{-[\alpha c_G + (1 - \alpha)c_B]d + \alpha P_G r_G + (1 - \alpha)\beta}{\alpha P_G}$$

Similarly, when  $\frac{\beta}{c_B} \leq d < \frac{P_G(r_G - r_i)}{c_G}$ , borrowers with good projects would disclose information at the time, and borrowers with bad projects would not disclose information when social welfare and investor yields are:

$$SW_1 = -c_G d + P_G \times R_G - (1 + r_0)$$

$$r_i^1 = -\frac{c_G}{P_G} d + r_G$$

Similarly, at that time when  $d \geq \frac{P_G(r_G - r_i)}{c_G}$ , since the total cost of information disclosure is too large, borrowers of good or bad two categories of projects are not disclosed, at this time, social welfare and investor yields were:

$$SW_n = \alpha \times P_G \times R_G + (1 - \alpha) \times \beta - (1 + r_0)$$

$$r_i^n = r_G + \frac{(1 - \alpha)\beta}{\alpha P_G}$$

#### 4. CHANGES AFTER JOINING THE INTERNET

With the wide application of Internet technology in the loan market, the borrower information disclosure cost decreased, and the borrower can analyse the investor preference for the use of the Internet technology, targeted for product design, and thus worsen the larger project risks packaged into investor preference products, inducing investment. Therefore, we consider that in the Internet banking background, the marginal cost of information disclosure of bad projects will decline substantially, and the decline will be greater than the decline in the marginal cost of information disclosure of good projects.

The marginal cost of information disclosure of a good project after joining Internet technology is  $c_G^{net}$ ; the marginal cost of information disclosure for bad items after joining Internet technology is  $c_B^{net}$ ; and  $c_G^{net} < c_G$ ;  $c_B^{net} < c_B$ . and  $\frac{c_G}{c_G^{net}} < \frac{c_B}{c_B^{net}}$  indicated that with the addition of Internet technology, the project information disclosure declined below the marginal cost of bad project information disclosure costs decline, while a bad project issued marginal cost is still higher than the same signal

project, i.e.  $c_G^{net} < c_B^{net}$ . To simplify, we make  $\gamma = \frac{c_B}{c_G}$ ,  $\gamma^{net} = \frac{c_B^{net}}{c_G^{net}}$ , respectively before and after the addition of the Internet technology, good and bad project information disclosure between marginal cost, and Internet technology after accession, narrow the differences between marginal cost two of the project information disclosure, i.e.  $1 < \gamma^{net} < \gamma$ .

Therefore, under the Internet technology, we still have the following lemmas:

Lemma 2: There exists  $\underline{d}^{net}$  and  $\bar{d}^{net}$  and when  $\underline{d}^{net} \leq d < \bar{d}^{net}$ , it makes a good project disclosure at the time to obtain investment; bad items do not disclose information. By Lemma 1 and 2 we get, at that time, therefore, in the context of Internet banking, good and bad two kinds of projects will be information disclosure, forming a pooling equilibrium. Social welfare for:

$$SW_y^{net} = -[\alpha c_G^{net} + (1 - \alpha)c_B^{net}]d^* + \alpha \times P_G \times R_G + (1 - \alpha) \times \beta - (1 + r_0)$$

Therefore, we can draw the following propositions:

Proposition 2: when  $\alpha < \bar{\alpha}$ ,  $SW_y^{net} < SW_1$ , it indicates that under the Internet financial background, if investors in accordance with the original level of information disclosure for standard screening borrowers for investment, due to the disclosure of marginal costs declining, bad borrowers will be information disclose information about bad projects in order to obtain investment which will damage the social welfare. Among

them, there are  $\bar{\alpha} = 1 - \frac{c_G - c_G^{net}}{c_B \times \beta}$ , and  $\lim_{\rightarrow c^{net}} \bar{\alpha} = 1$ . At the same time, the optimal level of information

disclosure for Internet banking, that is  $d^{net*} = \frac{\beta}{c_B^{net}}$ . At this point, the general welfare of society is:  $SW_1^{net*} = -c_G^{net} d^{net*} + P_G \times R_G - (1 + r_0) < SW_1^*$

From this we derive proposition 3:

Proposition 3: with the realization of Internet technology information disclosure of marginal costs decline at the same time, the optimal level of information disclosure of the total social welfare is less than Internet technology not to join the total social welfare, and indicates that the application of Internet technology in the financial lending in the market did not reduce the total transaction costs, but damages the social welfare. Furthermore, we should consider the relation between social welfare and information disclosure.

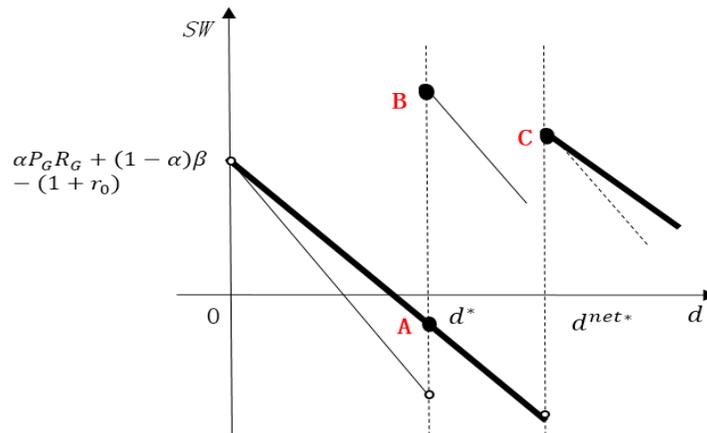


Figure 2: the relationship between social welfare and information disclosure

From Figure 2, we can see that the social welfare and information disclosure have a reverse relationship. In Figure 2, the thin lines represent the relationship between the information disclosure and the level of social welfare under normal circumstances; the thicker lines represent the Internet financial background, ultimately the relationship between information disclosure level and social welfare.

Under the background of Internet finance, the marginal loss of social welfare decreases because of the marginal cost of information disclosure and the marginal increase of information disclosure level. Point A represents, in the context of Internet banking, the optimal level of information disclosure in the general case ( $d^*$ ) under the social welfare. Point B represents the optimal level of information disclosure of the general situation in the social welfare ( $d^*$ ). Point C is the optimal level of information disclosure of the Internet financial ( $d^{net*}$ ) under the social welfare. From the relative position of three points, we can see that in the context of Internet banking, investors will be impaired in social welfare if they are screened according to the original level of information disclosure as a standard. At the same time, the use of Internet technology in the financial lending market has not effectively reduced the total transaction costs, and the social welfare under the optimal information disclosure level is less than the total social welfare when the Internet technology is not added.

Further, consider the relationship between investor returns and optimal information disclosure in equilibrium.

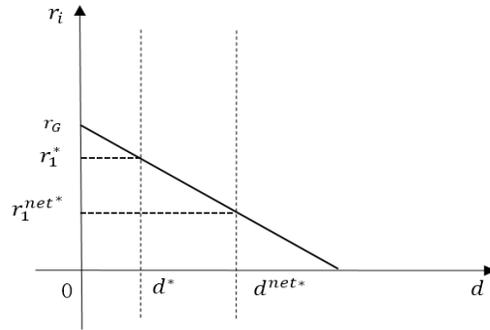


Figure 3: the relationship between return rate and optimal information disclosure

From Figure 3 we can see the complete competition in the market, the rate of return of investors and information disclosure level showed the reverse changes in the relationship, which indicates that the Internet financial background, the optimal level of information disclosure, the actual rate of return investors in decline. Therefore, investors in the face of the Internet financial "high-yield high returns" "servicing" commitment should be vigilant.

Finally, the relationship between the marginal cost of information disclosure and social welfare is examined.

(1)  $\beta < P_G R_G - (1 + r_0)$  :

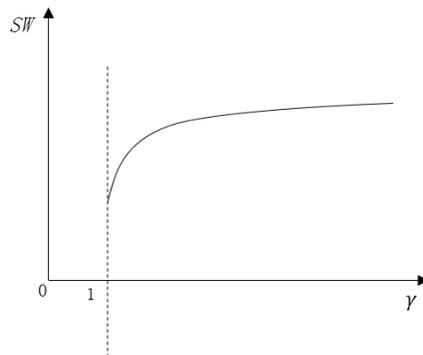


Figure 4: the relationship between marginal costs of information disclosure and social welfare

(2)  $\beta \geq P_G R_G - (1 + r_0)$  :

From this we can draw the following propositions:

Proposition 4: (1) when  $\beta < P_G R_G - (1 + r_0)$ , bad borrowers are less profitable (i.e. not for most of the money), and the difference between good and bad project information disclosure of the marginal cost, is not too large, and ensures that social welfare is positive; (2) when  $\beta \geq P_G R_G - (1 + r_0)$ , bad borrowers are profitable to a higher degree (i.e., there is great possibility that most of the money can be defrauded), to realize the social welfare promotion in the optimal level of information disclosure, the difference between good and bad project information disclosure of marginal cost must be expanded.

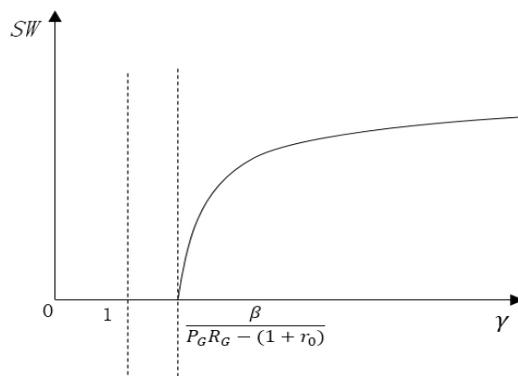


Figure 4: the relationship between marginal costs of information disclosure and social welfare

Therefore, nowadays various investment projects into the financial market is uneven in quality. The Internet technology on the one hand, reduces the transaction costs of financial services. However, on the other hand, it reduces the marginal cost differences of bad projects' information disclosure which increases the effective boundary of signal transmission, in the end the total transaction costs rise that caused the loss of social welfare. At the same time, in the face of the complicated Internet financial services, there is a big market risk, once more "full-time" financial frauds are entering the market, the marginal cost differences between good and bad projects need to be expanded, in order to better identify the market good and bad projects, improve investment efficiency.

## 5. DISCUSSION

FinTech is able to lower costs and facilitate access to financial products and markets and cover more consumer groups and more financial investment products and services. However, the lack of information disclosure leads to the credit risk caused by asymmetric information. Many events in reality, such as running away with money, conducts by the improper information disclosure; the regulators cannot discover the existence of information disclosure problems immediately; it brings great loss to the investors and also bring bad influence on the reputation of the industry. Therefore, based on Spence's signalling model, we mainly discussed whether or not the Internet efficiently increased the preciseness of information's transmission in financial market and lowered the total cost of financial transactions especially with the lower cost of information disclosure.

Up until now, based on what previous specialists have researched, the findings are listed as following: FinTech does not change the original risk attributes and types of traditional financial business, with traditional credit risk, liquidity risk, interest rate risk and reputation risk still existing in related FinTech business. Compared with traditional financial institutions and intermediaries, the loan default of borrowers for FinTech companies are more frequent. According to Grut (2016), since the barrier to entry for FinTech is relatively low, without any real technical innovation, and depending on the support by the financial teat of venture capital money, FinTech start-ups can profit. However, the business profiting model is not sustainable. Since, higher interest rates charged on the high-risk borrowers can not compensate for their

loan default because P2P network borrowing lacks complete credit cycle data accumulation and the accuracy of credit risk model based on large data technology and existing algorithms needs to be tested (Emekter et al., 2015). So, besides the credit grading evaluated by the FinTech startups, more other information is acquired to improve the accuracy of predicting default

Policy proposal: to expand the marginal cost difference between the good and bad projects is to improve supervision and legal system.

Our Research shows that after the implementation of information disclosure of the marginal cost of declining Internet technology, if investors do not to join the Internet technology in accordance with the information disclosure standards for screening of investment projects, investment projects will lead to be harmful. The expected investment returns would be less than zero. At the same time, the optimal level of information disclosure of the total social welfare is far lower than that of Internet technology not to join the total social welfare, which indicates that the use of Internet technology in financial lending in the market did not reduce the total transaction costs but damage the social welfare.

Based on the research conclusions of previous experts and what we have done, we intend to conduct a policy proposal that improve supervision and legal systems so that they can expand the marginal cost difference of information disclosure between good and bad projects. At the same time, regulatory authorities need to balance carefully efficiency and stability trade-offs in the face of these rapid changes. They need to be assured that risks to stability and integrity— including from cyberattacks, money-laundering and terrorism financing—can be effectively managed without stifling innovation. They need to ensure that trust is maintained in an evolving financial system. In particular: regulators may need to complement their focus on entities with increasing attention to activities, as financial services are increasingly provided by a diverse group of firms and market platforms. Governance needs to be strengthened. Rules and standards will need to be developed to ensure the integrity of data, algorithms, and platforms. Policy options to support open networks could be considered. In doing so, central banks may need to assess costs and benefits of increasing access to their settlement systems or offering digital national currencies. Legal principles need to be modernized. Maintaining trust in financial services may also require the development of new legal rules to clarify rights and obligations within the new global financial landscape (Dong He, 2017). In the future, the fintech system will definitely be regulated and will be one of the profitable industries in the business world.

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## Economic Impact of Doping on Professional African Female Marathon Running and the Use of the Doping Dilemma in an African Context

Denise Kamyuka \*

### ABSTRACT

Various authors have researched the Doping Dilemma” (Buechel, Emrich & Pohlkamp, 2014) and (Shermer, 2008); however, there is a lack of research on the application of the doping dilemma in an African context. Data from the International Association of Athletics Federation (IAAF) are analyzed to establish a prevalence in doping amongst women from developing countries. Whilst the possible solutions, theorized by Eber and Thépot, (1999) are employed to mitigate the economic impact of doping on African-female marathon running. It was found that the solutions theorized by Eber and Thépot, (1999) are invalidated by the poor infrastructures in drug regulation, lack of highly skilled man power, corruption in sporting systems and the economic burden on African females.

### INTRODUCTION

Marathon running is amongst the most rudimentary sports in the world, requiring no infrastructure or equipment. This characteristic makes it the ideal sport for developing countries with low GDP despite Heinemann’s, (1993) implications that sport in developing countries cannot attain the “high-performance levels of their developed world counterparts.” Heinemann attributed this premise to the economic deficiencies in sporting infrastructure, skilled and experienced coaches and allocated sport funding. Marathon running however has debunked this premise, as currently 17 out of the top 20 elite marathon runners come from Kenya and Ethiopia (Table1). In 1960 during the Rome Olympics, Ethiopian runner, Abebe Bikila won Africa’s first gold Olympic marathon medal. Bikila shocked spectators as he ran the entire marathon barefoot, testifying to the concept that marathon running is indeed, rudimentary. This victory garnered attention amongst Ethiopians and Kenyans, inspiring others to reach international recognition and financial gain through long distance running. Since then, there has been a surge in east African participation in marathons, which has precipitated into an East African dominance in the sport.

Despite the world-class success of marathon running by East Africans, its impact on East Africa’s economy remains poorly measured, “in this day and age there is no data on the economic value of sports in Kenya (“Establish the real”, 2015. para.5) Although, sports’ impact on Kenya’s economy remains neglected, its potential for economic development is not; sport is increasingly being recognized as a driver of economic development by governments and NGO’s alike. Additionally, private companies are increasingly utilizing sports to meet their corporate social responsibility outcomes, for example in 2012 Molnar et al. (2012), recorded that Coca-Cola sponsored about 280 sport related programs in over 115

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countries. To add to this economic potential through the sport, Africa has been awarded its first Gold standard marathons by the International Association of Athletics Federation (IAAF), the Sanlam Marathon (“IAAF gold label,” 2018). This annual award (if sustained) will help boost South Africa’s already booming marathon scene and increase its appeal as a destination marathon event.

**Table 1:** 2017 IAAF top 20 ranked female marathon runners <sup>(1)</sup>

Rank	Competitor	Nationality	Rank	Competitor	Nationality
1.	Mary Jepkosgei Keitany	Kenya	11.	Eunice Jepkirui Kirwa	Bahrain
2.	Tirunesh Dibaba	Ethiopia	12.	Berhane Dibaba	Ethiopia
3.	Sarah Chepchirchir	Kenya	13.	Flomena Cheyech Daniel	Kenya
4.	Brigid Kosgei	Kenya	14.	Yuka Ando	Japan
5.	Gladys Cheronon Kiprono	Kenya	15.	Visiline Jepkesho	Kenya
6.	Ruti Aga	Ethiopia	16.	Tadelech Bekele	Ethiopia
7.	Valary Jemeli Aiyabei	Kenya	17.	Amane Beriso	Ethiopia
8.	Purity Rionoripo	Kenya	18.	Worknesh Degefa	Ethiopia
9.	Jordan Hasay	USA	19.	Ruth Chepngetich	Kenya
10.	Agnes Jeruto Barsosio	Kenya	20.	Roza Dereje	Ethiopia

The increase media scrutiny of the IAAF’s however, has put doping at the vanguard of threats to the economic viability of professional marathon running. In 2014 two prominent female marathon runners were found guilty of doping and banned from racing. The two women were 3 time Boston marathon and 2 time Chicago marathon winner Rita Jeptoo of Kenya and Liliya Shobukhova of Russia, who had the 2<sup>nd</sup> fastest time in women’s marathon running (Pilon and Longman, 2014). There has been increased scrutiny over doping by Russian and Kenyan athletics associations following the release of the second investigative documentaries conducted by German TV station ARD. The documentary alludes to the practice of Kenyan athletics association officials concealing failed doping tests for a cut of the athletes prize money; should they win (Seppelt, 2015) and a state-run Russian doping system (Seppelt, 2014). Investigations run by Richard McLaren two other members of the WADA appointed independent commission, linking the Russian Ministry of Sport and Federal Security Service to a state-sponsored doping scheme (Gibson, 2016).

## **THE ADVERSE EFFECTS OF DOPING ON PROFESSIONAL AFRICAN-FEMALE MARATHON RUNNING**

### **SPONSORSHIP OF WOMEN’S MARATHON**

Early sponsorship of women’s long distance races was provided by the likes of Hanover Trust, New Times magazine and Bonne Bell cosmetics (Kessler, 1979). In 1974 and ‘75 Dr. Ernst Ban Aaken sponsored the first international women’s marathon championship in which 9 countries participated. 1978 saw the launch of the first Avon sponsored international women’s marathon series, capitalizing on the growing trend of women running mid and long distances to stay fit and slim (Cooper, 1995). Avon

considered the rise in popularity of marathon running the perfect opportunity to appeal to the ideal population of housewives and determined women. Avon's events were typically accompanied by health and beauty workshops as business opportunity workshops. In 1979, the Avon International Championship attracted 250 female runners from 25 different countries, dispelling the IOC's perception of distance running, as an unpopular sport amongst women. In addition to sponsoring the event, Avon "announced it would pay training expenses for the first six finishers" of the American qualifier race (Kessler, 1979). By 1981 the Avon International marathon had become one of first women's marathons to offer prize money; the prize money was aimed to subsidize runners' developmental training costs ("Avon," 2016) and make the sport economically sustainable for talented runners.

In 1979, the International Runners' Committee and the IAAF, along with the moral and financial support of Nike, began lobbying for the inclusion of the women's distance running in the 1984 Olympics. Following the success of various women's marathon events and the increasing frequency of sub 2 hour 40 min finishers, the IOC finally agreed to include marathon running in the 1984 Los Angeles Olympics. The impact of this decision on the economics of marathon running, was also magnified by the changing nature of Olympic sports as they progressed from pure amateurism to games for semi-professional athletes. This advance in sports, allowed runners that had previously won cash prizes for running (thus no longer considered amateurs) to be eligible of the Olympics (Lovett, 1997).

In current times, sponsorships of not only women's marathon events but also the IAAF are under threat. In 2008 IAAF announced its 11-year sponsorship contract with shoe and sports apparel company Adidas. This sponsorship was aimed at supporting IAAF's intercontinental development programs and the provision of advanced apparel, footwear and equipment ("IAAF and Adidas," 2008). However, considering the doping and corruption allegations faced by the IAAF, Adidas had decided to terminate its sponsorship early. Some may feel that this in part was due to Adidas' new social media and individual athlete focused marketing strategies but one thing is certain, this could leave many grassroots programs (arguably the largest contributor to today's elite female athlete development) malnourished of quality personnel and running equipment for optimum training.

Adidas decision plays a large role in forcing the IAAF to scrutinize its systems and clean their act, however, it has been no surprise that Asics jumped at the opportunity to increase their presence in the sport. The clout that comes with presenting some of the world's most remarkable athletes, overshadows track and fields' growing reputation of corruption and history of doping. The IAAF has made some audacious moves following this threat to their credibility, one such move being the suspension of the All-Russian Athletics Federation (ARAF) from IAAF membership and the consequently the banning of Russian track and field athletes team from participating in the Rio Olympics ("IAAF provisionally suspends Russian," 2015). This decision comes after IOC president Thomas Bach deferred disciplinary action against Russia to International Federations, pending the IOC's final disciplinary decision. However, despite obvious efforts to regain credibility and make a strong stance on doping, Asics has only signed a 3-year sponsorship deal with IAAF, perhaps as a precaution, incase more scandals are revealed that could affect Asics credibility.

### **LABOR MIGRATION IN MARATHON RUNNING**

Most elite athletes race internationally and in some cases, live in foreign countries where they can make a living off professional marathon running. Njororai, (2012) draws theoretical motives for marathon runners' migration from Maguire's, (1999) typologies. Njororai, (2012) describes marathon runners from developing countries as "mercenary," migrating in search of capital gain and economic opportunities to earn a living. Bahrain and Qatar are examples of countries that even pay athletes to train with in their country; they believe that their runners and coaches stand to benefit from having quality runners training with them. She also describes them as "settlers" (p. 198), athletes that permanently move to another country where they can compete and train for a living. In many cases, these athletes change their citizenship status to claim that of their adoptive country, sometimes even incurring the social cost of assuming a new religion. Although the Middle East has now become a more common location for marathon runners it is not traditionally looked at as a "settlers" location as much as North America and Europe are.

Controversial stories of desperate doping culprits like Lilian Mariita, who had been running minor marathons throughout the U.S to support herself and send money home to her impoverished community in Kenya (Leicester and Pells, 2016). Doping in marathon running seems to be the only means of ensuring a paycheck and making a viable living, for many female athletes. The issue of doping also jeopardizes the credibility of Female Marathon runners' agents and management. Some second-tier races have gone as far as implementing anti-doping policies of their own, which specify that "athletes won't be eligible for prize money if they work with agents who have had two or more athletes banned" (Leicester and Pells, 2016. para. 6). This would make it considerably hard for other marathon runners to find agents that are still eligible. Even the more prominent names such as Frederico Rosa and Alberto Salazar would fall into this category of ineligible agents, if forced to adhere to these policies. For athletes that have left their homes and families in search of an opportunity to earn a living from marathon running, this could serve as a snag in their pursuits as they rely on the expertise and connections of their agents to ensure they have an economically sound calendar of marathon events. Sanctions on agents that have convicted athletes, subsequently denigrates all athletes represented by the same agent.

### **REMUNERATION**

As demonstrated in figure 2. much like tennis, women's prize money is almost on par if not equal with that of their male counterparts. Equal pay and media coverage stand to be the most notable contentions in the battle for equality in sports, however marathon running is already many steps ahead in offering the same opportunities for professional success for both men and women. This assumption however is marred by the difficulty in finding accurate and explicit details on the earnings of marathon runners, as many marathon organizers keep appearance fee contracts under wraps.

Using the 2012 New York Marathon (despite its cancellation) as an example, we can assume that elite marathon runners (such as Meb Keflezighi) stand to make hundreds of thousands in appearance fees,

even second-tier runners are given minor contracts for appearance fees, allowing them to attend the race and in some cases giving them an opportunity to be spotted by top agents and sponsors (Longman, 2012). According to Longman's (2012) article; as part of the World Marathon Majors, this event gave runners, Edna Kiplagat and Sharon Cherop a chance at winning an extra \$500 000 for having the most wins in the World Marathon Majors Marathons that season. For many elite runners, running and perhaps winning at least 2 major marathons in a season is enough to sustain them for the year.

In addition to prize money and appearance fees, most major marathons (e.g. New York Marathon and Seoul International Marathon) offer a bonus amount of money for breaking records or running under a barrier time. Most of these times, however, are set on records that were set by runners in an era of mega-doping, when doping tests were not as reliable as they are now (Epstein, 2015). Suspicion of doping in those times has either served to discourage runners from even attempting to break those times or resort to doping themselves.

**Table 3:** Structure of purse prizes for Major Marathons

<b>Marathon</b>	<b>Purse size (\$)</b>	<b>1<sup>st</sup> place males</b>	<b>1<sup>st</sup> place females</b>	<b>Race record breaking bonus</b>	<b>World record breaking bonus</b>
Los Angeles <sup>(2)</sup>	150, 000	25, 000	25, 000		
Chevron Houston <sup>(3)</sup>	268, 000	45, 000	45, 000	30, 000	100, 000
BMW Berlin <sup>(4)</sup>	830,500	48, 000	48, 000	25, 000	62, 000
Virgin London <sup>(5)</sup>	313, 000 <sup>(*)</sup>	55, 000	55,000	125, 000	
Seoul International <sup>(6)</sup>	334, 000	80,000	80, 000	500,000/ 300,000 <sup>(**)</sup>	200,000/ 100,000
Tokyo <sup>(7)</sup>	≈300,00	80, 000	80,000	300,000 <sup>(***)</sup>	
Bank of America Chicago <sup>(8)</sup>	550, 000	100, 000	100, 000	75, 000	75, 000
TCS New York City <sup>(9)</sup>	825, 000	130, 000	130, 000	50, 000 <sup>(****)</sup>	-
Boston <sup>(10)</sup>	830,500	150, 000	150, 000	50, 000	25, 00
Standard Chartered Dubai <sup>(11)</sup>	940, 000	200, 000	200, 000	100, 000	
Sanlam Cape town <sup>(12)</sup>	76, 000	22,350	22, 350	8,500	
* The purse is supplemented with a \$100, 000 monetary incentive for runners who finish under 2.05 (male) 2.18 (female), the incentive, goes down approximately \$25, 000 for every extra minute. **Women earn less than men in time bonuses. ***Limited information of the how prize money is allocated between men and women for time bonuses. ****Time bonus based on running under 2:05:30 (males) or 2:22:30 (females) and not on breaking records.					

Game theory is a mathematical interpretation of strategy, used to quantify the decision-making phenomenon that occur when agents compete in a game. The theory assumes that all decision makers are rational beings, attempting to secure the best possible outcome for themselves. Game theory is not confined to actual games or sports, but can be used in any circumstances where the decision of one party subsequently affects how other participants decide to act (either in cooperation or competition). For

example: a player in a chess match may recognize a possible advantage for his/her opponent and make his/her next move to either block the other player or to try force the other player to play defensively. A scenario for cooperation within a competitive game, may be that of players in a tournament, who realize that the player that wins would earn enough points to definitely make it to the next round, the loser would definitely be eliminated and a draw would give them both a chance to still make it into the next level. If both players are under the assumption that the other player is willing to settle for a draw, they might decide to cooperate (this is illegal in most cases, but still occurs in reality).

Game Theory has been applied not only to sports and games, but to politics, economics, international relations and many other fields. Game theory, is a principle established by the mathematician John Von Neumann but made famous by the John Nash, who brought to fruition the concept of Nash equilibrium (Dixit & Nalebuff, 2008). The Nash equilibrium, is a concept that assumes that participants will look for a strategy that they can benefit the most from, while all other participants are also playing their best strategy. A Nash equilibrium is struck when each player's best strategy is being played, however, the equilibrium may not always lead to a communal benefit. In fact, in some situations everyone's best strategy may not result in positive outcomes, but is instead chosen because it has the least severe consequences for all. This scenario is known as the Prisoner's Dilemma.

### **DOPING DILEMMA**

Authors have tried applying the Prisoner's Dilemma to understand athlete's' decisions to dope, aptly naming it the Doping Dilemma. The Doping Dilemma is based on a series of decisions that athletes make when faced with the choice of taking performance enhancing drugs in or out of competition. As explained in the previous section, an athlete's decision to dope will be affected, or even determined by whether other competing athletes decide to dope. The Doping Dilemma is designed in a way that all participants know the consequences of their decisions, and that all participants are operating under incomplete information regarding the knowledge of what the other participants have or will decide. Based on these parameters the following choice sets are assumed:

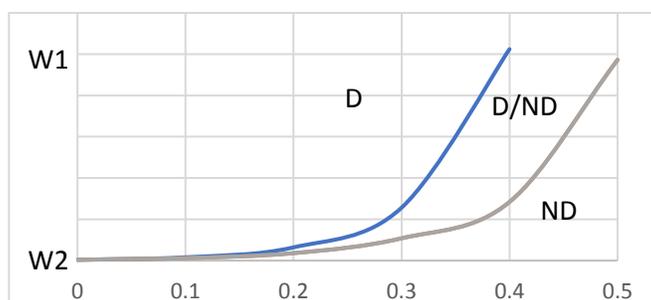
- If a player decides to not dope in a competition where everyone else is doping, the player will certainly lose, unless everyone else is caught.
- If a player decides to dope in a competition where everyone else is doping, he/she has an equal chance at winning. They also have equal chances of being caught and incurring the cost of being caught (i.e suspension, zero winnings, price of performance enhancers and health cost).
- The same is assumed, in a field, where no one decides to dope. They all have equal chances of winning however, assuming they are not at risk of being falsely implicated for doping.
- If a player decides to dope in a competition where no-one else is doping, the player will certainly win. If the player is caught however, he/she will not win anything and be penalized instead.

Doping is considered the lesser evil as a doping athlete either wins or at least stands a chance to win. Doping has a negative impact on athletes' health, according to WADA's "Dangers of doping," (2018) document.

Eber and Thépot's (1999) papers on competition design explore the concept of the doping dilemma which states that in the doping world the best strategy for competitors is to dope (Eber, 2008); the athletes believe that the only way to level the playing field is to dope, since everyone else is taking performance enhancing drugs. Their design model considers how drug test efficiency, the number of sports events, the spread of prizes, and perception of health costs, could be manipulated to deter competitors from doping. They conclude that by making changes to the structure of the competition, such as reducing the monetary incentives to dope, narrowing the spread in prize money, increasing the likelihood of getting caught doping, and increasing the opportunities to compete, could help obviate a doping environment. It is suggested that social interventions that highlight the health risks of doping and furnish customers with candid information about the competitions, would also contribute to alleviation of the problem.

Shermer (2008), adds that by giving former athletes immunity for sharing any doping information they may be privy to, would lead to more enlightened doping policy making. To augment this suggestion, he proposes that increasing the repercussion for convicted athletes and their teams could lead to a team wide self-regulation on doping. Sherner's contribution however valid, could be interpreted as fallacy after analyzing the work of Andrea Petróczi and Haugen (2012)., and Mallia et al. (2016). We realize that in circumstances of self-reporting and team reporting, the dominant strategy is to lie and thus distorts the analysis on the prevalence of doping. Establishing prevalence is considered by these authors, as essential for policy change to be initiated.

**Figure 2.** Nash equilibrium of doping dilemma (Eber & Thépot, 1999)



The graph above, depicts how changes in the aforementioned elements could be manipulated to deter doping in competitions. Area **D** represents a world where everyone is doping, and **ND** represents a world where no one dopes. Area **D/ND** represents a world where one competitor chooses to dope, while the other chooses to not dope (i.e. the real world where this is a combination of dopers and non-dopers). **W1** represents prize money for first place and **W2** represents prize money for second place **P** represents the probability that athletes will get caught doping. The graph depicts that as the spread between W1 and W2 decreases the area of non-dopers increases.

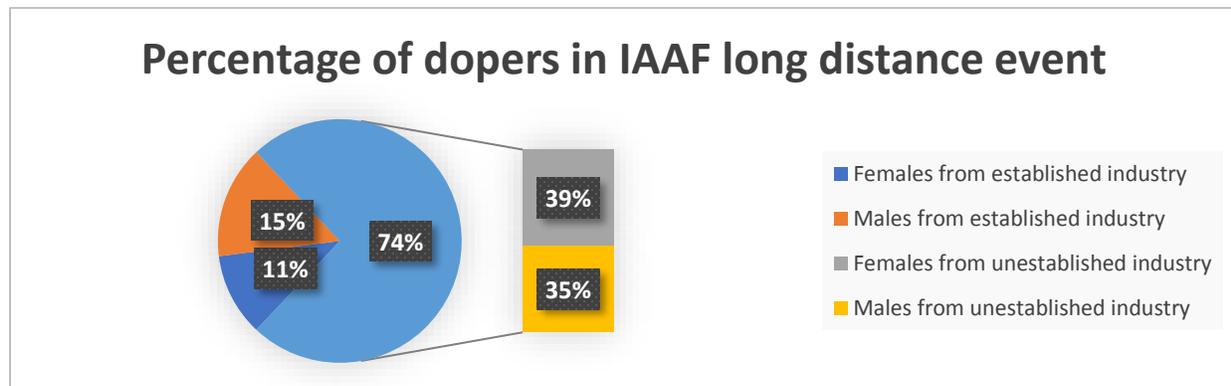
Buechel, Emrich and Pohlkamo (2016), built on this concept by stratifying the theory with a third player, the customer. They argued that by increasing transparency of doping procedures and test results to the public, competitors will be less likely to dope. They determine that perceptions about the credibility of athletes and the rigor of testing policies may affect behavioral intent of customers and play a significant role in the economics of the competition.

This theory, however also brings rise to the fact that, the adverse effects that positive dope tests have on viewership and fan support, may ultimately affect consumption and revenue for stakeholders. Fear of this kind of outcome may therefore lead to stakeholders taking measures to cover up or avoid positive dope tests.

The main limitations with these models, is oversimplification of conditions, in order to demonstrate the model. In reality competition includes far more participants and stakeholders that add layers the models' assumptions and complicate the explanation. Also, the participants described, are not 2D characters with overly predictable thought processes, on the contrary the factors that go into decision making are multidimensional. The reality is, people make choices based off their circumstances, motivations, stressor, personalities and plethora of other considerations (Mallia et al., 2016).

## ESTABLISHING PREVALENCE OF DOPING BETWEEN AFRICAN WOMEN AND MEN

**Figure 2.** Percentage of dopers in IAAF long distance event



The pie chart shows the percentage of IAAF athletes that were convicted of doping in 2017/18 according to the IAAF's "List of athletes and athletes support personnel currently serving a period of ineligibility as a result of anti-doping rule violation, under IAAF rules" (IAAF). The Graph shows that there is a prevalence in doping amongst countries that do not have an established marathon industry. An established industry was determined upon having 80 marathon events or more per calendar year, or hosting an IAAF gold award race. The results were also filtered to only include all events the IAAF classifies as long distance events. Establishing data that shows that women long distance athletes dope more than their male counterparts, adds to the significance of this paper.

**APPLICATION OF THE 'DOPING DILEMMA' AND COMPETITION DESIGN IN AN AFRICAN CONTEXT**

According to Eber (2012) “from the economic analysis of doping behavior, the fight against doping should obviously be organized so as to alter athletes’ economic incentives to use drugs” (p.199).

**DRUG TEST EFFICACY**

According to Eber and Thépot’s (1999) model, as the probability of getting caught increases, the population of non-dopers increases. One way of increasing the probability of getting caught is by improving the efficacy of drug testing. This theory however, is undermined by the fact that the IAAF and WADA do not test all athletes that compete on an international stage. These organizations rely heavily on the doping programs of the national athletics associations in different countries. However, for many countries in Africa, a comprehensible doping program that incorporates up-to-date methods of record keeping and gene doping detection, is out of their budget. Not to mention that there are no WADA accredited laboratories in Africa (“Accredited labs”, 2018) and a critical shortage of drug regulatory experts (Ndomondo-Sigonda et al., 2017). In addition to the efficacy of doping programs, African (even Western) governments are still struggling to develop policy and regulations that monitor the composition and efficacy of non-therapeutic supplements. Poor efficacy in this regard also threatens the sporting world, as many athletes fall victim to unintentionally consuming banned substances, when consuming dietary supplements that are deemed to not contain prohibited substances (Martínez-Sanz et al., 2016).

The political climate in many African countries pose as an exogenous factor in this analysis, undermining the effectiveness of doping policies. Many countries face issues of systematic corruption (Tsumi, 2016), with reports of officials taking a cut of runners’ prize money in exchange for concealed negative test results (Seppelt, 2015).

An additional global concern about the efficacy of drug tests, is the tremendous speed in which drug designers and enablers discover and create new technologies to stay ahead of the most current testing methods (Bejder et al., 2016). Scientists are constantly improving the therapeutic effects of drugs, particularly gene therapy. This advancement has however, inadvertently done the groundwork for inconspicuous doping. Scientists create drugs that structurally mimic and illicit the same biological responses as their biological counterparts, thus compensating for physiological deficiencies (Gould, 2017). These new drugs with better bioequivalence however, make it harder for test to detect and differentiate synthetic molecules from biological molecules.

**REDUCING THE SPREAD OF PRIZE MONEY**

The graph predicts that a decrease in W1 would lead to a decrease in the population of dopers (D). Marathon running is a negligible industry in Africa, safe for South Africa which host 25 of the 85 African long distance events on the 2018-2019 Ahotu marathon calendar. For the most part, sports in Africa is recreational and financed by the government meaning that private companies seldom sponsor or support

sporting events. This thus undermines the potential for supplementary income through sponsorships, which could otherwise help reduce the gap the income between first place winners and second place winners. The phenomenon of marathon running as a middle class recreational sport however, does leave a lot of untapped potential in designing the right appeal for private sector buy in. To augment the argument about sponsors, one could also debate that African female marathon runners, do not meet the commercial and superficial standards commonly employed by multi billionaire companies and are thus not candidates for endorsements.

### **INCREASE AWARENESS**

The social constructs surrounding marathon running, such as education, organizational transparency, governance are fundamental issues organizations like IAAF and WADA are largely incapable of fixing. To increase awareness of the risk of doping, audience appropriate educational campaigns are necessary however, the education of women in African countries continues to lag as a developmental aspiration. Lack of education does not only make it hard to adequately convey the message on the dangers of doping but it also hinders progress in health workers' efforts to convince the locals to stop taking traditional herbs and medicines. Many of these remedies and herbs have no scientific basis for their use and the actual compositions and effects on the human body are not thoroughly researched and understood. In a report for WADA, Boit et al., (2012) found that 43% of elite athletes surveyed, had little knowledge on prohibited substances and testing methods. A reason for this, may be the reported 72% of athletes that have never attended an anti-doping workshop.

### **DISCUSSION AND CONCLUSION**

Marathon running within Africa is still a novel sport, little potential of becoming an economic contributor to a country's GDP. This is mainly due to the culture of sport in Africa, which is rarely viewed or successful as a business. A more effective means of leveraging African females' talent, may be to discover a system that optimizes the development of athletes and the export of these athletes. Athlete labor migration is a significant economic factor in sports business, especially in soccer. The only contention here would be how to ensure the integrity and emotional health of the athlete is catered to. Issues associated with citizenship also come into play, there is a need to consider whether the country of origin gets its due credit and benefits from their running while meeting the expectations of the importer.

Recent advances in the status of professional marathon running, such as establishment of Africa's first IAAF Gold marathon (meaning the prize money is comparable to other major marathons) and the new laws on citizenship for runners in foreign countries, may have a direct impact on the dynamics of migration and subsequently alter how doping impacts this economic factor.

There is cause for future research to look at realistic means of leveraging marathon running as a tool for the economic empowerment of women. In figuring out how to adequately educate women on the dangers of performance enhancing drugs, there is an opportunity to explore the channels that could

promote better education for women through sport scholarships. Eber and Thépot's (1999), admit to the fact, that deterring doping is possible in theory but as demonstrated in our practical application of the theory, this is a fallacy. There are other economic factors that could be tackled in order to improve the marathon industry in Africa, one being a strategy to engage the private sector and forge sponsorships that give them better penetration to their target markets and simultaneously develop running talent and the local marathon industry.

## LIMITATION

The information gathered is mainly based on secondary literary sources. Theory based evidence is always subject to being out dated and thus calls for a more in-depth garnering of primary data to back up all theories about Africa's capability in established a dope-free marathon industry and talent pool.

## ENDNOTES

- (1) <https://www.iaaf.org/records/toplists/road-running/marathon/outdoor/women/senior/2017?regionType=world&drop=all&fiftyPercentRule=regular&page=1&bestResultsOnly=false>
- (2) Lair K., (2015) Los Angeles marathon 2105: Everything you need to know about Sundays race. Retrieved from <https://www.dailynews.com/2015/03/13/los-angeles-marathon-2015-everything-you-need-to-know-about-sundays-race/>
- (3) <http://www.chevronhoustonmarathon.com/hmc-announces-increased-elite-prize-purse-for-2017-chevron-houston-marathon/>
- (4) <https://www.wired.com/story/the-blockbuster-showdown-at-tomorrows-berlin-marathon/>
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- (9) <https://www.tcsnycmarathon.org/about-the-race/prize-money-and-bonus-awards>
- (10) <https://www.bostonmarathonmediaguide.com/prize-structure/>
- (11) <http://www.dubaimarathon.org/race-info/prize-money/>
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# **Self-Selection to Export: Understanding the Evidence and Impact of Increasing Marginal Cost**

**Umut Erksan Senalp\***

## **ABSTRACT**

In this paper, we have revisited the predictions of Melitz (2003) by highlighting the restrictive assumption of constant marginal costs. We show that self-selection occurs in some industries, Textiles/Cloth/Leather and Other Manufacturing, while we found that less productive firms self-select to enter the export market in some other industries, such as Non-Metal Minerals and Motor Vehicles/Parts. Second, we show that this evidence against self-selection can be most convincingly explained by the existence of increasing, rather than constant, marginal costs.

## **INTRODUCTION**

The seminal paper of Melitz (2003) provides a theoretical framework of international trade that accounts for firm heterogeneity and shows that the most productive firms self-select themselves to enter the export market. Following this, a large number of empirical studies have examined the findings of Melitz (2003), which is referred to as the self-selection hypothesis, and the vast majority of these studies confirm a causal link between firm productivity and a firm's decision to export.

Although Melitz (2003) and subsequent works relax the homogenous firms assumption of the existing trade models, they maintain some restrictive assumptions, such as constant marginal costs - which implies that firms maximize profits in domestic and foreign markets independently of each other. On the other hand, for a firm producing with increasing marginal costs, the optimal approach will be to reduce its domestic sales in order to meet the increased export demand, as the marginal cost of production increases. For this reason, we believe that the constant marginal costs assumption plays a key role in the analysis of the self-selection hypothesis.

This paper focuses on this restrictive assumption of constant marginal costs to make two contributions that both cast doubt on the new generation trade models. First we show that our findings do not strongly confirm the self-selection hypothesis for some important industries. We find that self-selection occurs in some industries, such as Textiles/Cloth/Leather, and Other Manufacturing, while it does not in some others, such as Non-metal Minerals and Motor vehicles/parts. More importantly, we observe a pattern suggesting that self-selection does not occur in the UK industries where firms produce at increasing marginal cost. In the light of these results, we believe that Melitz's predictions should be re-examined by explicitly considering the differences between industries.

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Second, we show that this evidence against self-selection can be most convincingly explained by the existence of increasing, rather than constant, marginal costs. In particular, we show that the average rates of sales growth in domestic and foreign markets are negatively correlated in many industries, in a way that is consistent with increasing marginal cost. This negative correlation suggests that optimal output levels in each individual market are not independent of the other market for firms in some industries, and this raises doubts about the constant marginal costs assumption of both the standard and new trade models.

## DATA AND EMPIRICAL STRATEGY

In this study we have used the FAME firm-level database, which includes all manufacturing firms operating in the UK that are required to register their accounts at Companies' House. The FAME database contains information on many variables appearing in a firm balance sheet, such as number of employees, intermediate expenditure, total turnover, assets, and overseas sales. In addition to the financial information, FAME also provides information on the geographical location (UK regions) in which firms are based, the year of incorporation of the company, and SIC industry code. After the cleaning procedure our final dataset comprises an unbalanced panel, containing 9,752 firms with 54,609 observations for the 2003-2011 period. The dataset contains information on firms from 15 different industries based on their 2-digit 2007 SIC code.

It is suggested by the relevant literature that exporting firms face a sunk costs of entry to international markets where they are exposed to higher competition. Thus, it is claimed that only better firms can become exporters, in other words, the initial performance of a firm should be an important factor in the decision to export (Roberts and Tybout 1997; Melitz 2003). In this section, we aim to assess the determinants of the decision to export by focusing on the effects of sunk costs and some firm characteristics on the probability of becoming an exporter. We will conduct our analysis by utilizing a binary choice model, since our export participation variable is a binary variable (taking two possible outcomes, 0 or 1).

We use four different specifications: (1) Linear Probability Model, (2) Pooled Probit, (3) Random Effects Probit, and (4) Dynamic Probit. First, we estimate the following equation by utilizing a linear probability model and a pooled-probit model:

$$Y_{it} = \alpha_0 + \alpha_1 Y_{it-1} + \alpha_2 TFP_{it-1} + \alpha_3 Z_{it-1} + d_t + d_s + d_r + u_{it} \quad (1)$$

where  $\alpha_1$ ,  $\alpha_2$ ,  $\alpha_3$ , and  $\alpha_4$  are vectors of coefficients, and  $u_{it}$  idiosyncratic error.  $Z$  is a vector of control variables including firm-specific time-variant characteristics which were lagged one year period.  $d_t$ ,  $d_s$ , and  $d_r$  are time, 2-digit SIC sector, and region dummy variables. As we mentioned above, we added one year lagged export status to capture the sunk entry cost effects.

Table 1 reports that the estimation results for the first three specifications show that firm productivity is an important determinant of the export decision for the UK manufacturing firms, while the support for the self-selection hypothesis vanishes when we consider the sunk cost effect. The effect of average wage is positive and significant for specifications (1)-(3), implying that firms employing more skilled workers are more likely to export. However, the evidence for a positive relationship between labour skill and export disappears when we include sunk cost in our model. Our results for all specifications suggest that firms

with more experience in terms of years are more likely to export, given that we find positive and significant coefficients for the age variable. Finally, firm size, which is represented by the number of employees, also seems an important determinant of firms' export status, and the relationship is positive. This finding too is consistent with the literature.

**Table 1: Probability of Export (Dependent Variable:  $Export_t$ )**

	(1)	(2)	(3)	(4)
$export_{t-1}$	-	-	-	1.7048 (.0355) <sup>***</sup>
$\ln(TFP)_{t-1}$	.0125 (.0031) <sup>***</sup>	.0489 (.0091) <sup>***</sup>	.1175 (.0297) <sup>***</sup>	.0258 (.0293)
$\ln(empl.)_{t-1}$	.0428 (.0031) <sup>***</sup>	.1101 (.0066) <sup>***</sup>	.4359 (.0304) <sup>***</sup>	.0483 (.0147) <sup>***</sup>
$\ln(wage)_{t-1}$	.0307 (.0062) <sup>***</sup>	.1629 (.0175) <sup>***</sup>	.3903 (.0631) <sup>***</sup>	-.0444 (.0652)
$\ln(cap.int.)_{t-1}$	-.0087 (.0016)	-.2115 (.0235) <sup>***</sup>	-.0673 (.0794)	.0482 (.0843)
$age_t$	.0016 (.0005) <sup>***</sup>	.0028 (.0008) <sup>***</sup>	.0185 (.0052) <sup>***</sup>	.1553 (.0401) <sup>**</sup>
constant	-.2194 (.0394) <sup>***</sup>	-2.1888 (.0818) <sup>***</sup>	-7.9296 (.3852) <sup>***</sup>	.0079 (.0084)
year dummies	yes	yes	yes	yes
region dummies	yes	yes	yes	yes
Sector dummies	yes	yes	yes	yes

N. of obs. 42283 42283 42283 42283  
 Robust s.e. in brackets. \* indicates significance at the 10%, \*\* at the 5% and \*\*\* at the 1% levels. (1)LPM, (2) Pooled-Probit, (3) Random Effects Probit, (4) Wooldridge's Dynamic Probit

To sum up, the well-established self-selection hypothesis is confirmed for the UK manufacturing firms, when we ignore the potential effect of sunk cost of exporting (specifications 1-3). However, when we consider the sunk cost of export, the support for the self-selection hypothesis vanishes. This finding is in line with the results from Roberts and Tybout (1997); Bernard and Jensen 2004; and Arnold and Hussinger (2005) (and many others) who suggest that sunk cost matters in terms of export decision.

Almost all empirical studies in the literature on firm level productivity and export decisions examine the self-selection hypothesis by using pooled data, where all firms from different industries are considered together (as we do in the previous subsection). However, we show that each industry has different characteristics: firms in some industries operate with rising marginal costs, while in some industries they produce at a constant marginal cost. In order to account for such differences, we test the self-selection hypothesis again, but this time for each industry. Our estimates in the previous subsection show that the export decision at time t-1 is an important determinant of the export decision of a firm at year t, which suggests that the sunk cost of entering the export market is an important factor for our analysis. Thus,

amongst all four specifications, we decided to use Wooldridge's dynamic probit model for the current analysis, since, as we explained, it is the only one that is able to take the lagged dependent variable (which represents the sunk cost of export) into account.

**Table 2:** Probability of Export – Dynamic Random Effects Probit - (Dep.Var:  $Export_t$ )

Industry	$export_{t-1}$	$\ln(TFP)_{t-1}$	Number of Obs.
Food/Beverages/Tobacco	1.7355 (.1049) <sup>***</sup>	.0999 (.1120)	5360
Textiles/Cloth/Leather	1.5818 (.2054) <sup>***</sup>	.3439 (.2118) <sup>*</sup>	1155
Wood Products	1.9032 (.2642) <sup>***</sup>	.3521 (.3298)	899
Paper/Printing	2.0265 (.1418) <sup>***</sup>	.0931 (.1199)	3620
Coke/Chemicals	1.5492 (.0848) <sup>***</sup>	-.0638 (.0720)	6564
Rubber/Plastic	1.8322 (.1488) <sup>***</sup>	-.0473 (.1305)	2738
Non-metal Minerals	2.0008 (.2425) <sup>***</sup>	-.5501 (.2683) <sup>**</sup>	1285
Basic/Fabricated Metals	1.8271 (.0862) <sup>***</sup>	.0398 (.0664)	6889
Machinery/Equipment	1.5495 (.1104) <sup>***</sup>	.1129 (.0921)	4030
Office Equipment	1.7185 (.1691) <sup>***</sup>	.0236 (.1489)	1441
Electrical machinery	1.7694 (.1474) <sup>***</sup>	-.1589 (.1410)	2097
Motor vehicles/parts	1.5206 (.1869) <sup>***</sup>	-.3776 (.1358) <sup>***</sup>	1277
Other transport	1.4688 (.2727) <sup>***</sup>	.0478 (.1923)	962
Other manufacturing	1.6141 (.1422) <sup>***</sup>	.2857 (.1119) <sup>***</sup>	3966

Robust s.e. in brackets. \* indicates significance at the 10%, \*\* at the 5% and \*\*\* at the 1% levels

Table 2 shows that our findings for the self-selection hypothesis are mixed. We confirm it for some industries, such as Textile/Cloth/Leather, and Other Manufacturing. In other words, we find that more productive firms in these industries at time t-1 are more likely to enter the export market at year t. The probability of export increases by around 2.5%: a firm's productivity increases by 1% in Textile/Cloth/Leather industry, while it increases by around 8.5% for firms operating in Other Manufacturing Industry. These findings are consistent with Melitz's results, suggesting that more productive firms self-select to enter the export market.

On the other hand, we observe a negative and significant relationship between TFP and the export decision for some industries, such as Non-metal Minerals and Motor Vehicles/Parts. This finding is very interesting because it suggests that, in these industries, less productive firms self-select to export, which is the opposite of Melitz's findings.

Finally, we find a positive but not significant relationship between TFP and export decisions for some industries, such as Wood Products and Paper/Printing, while for some other industries, such as Electric Machinery and Coke/Chemicals, this relationship is both negative and insignificant.

### Testing the Marginal Cost Assumption

In this section we examine the relationship between export and domestic sales for the UK manufacturing firms. We aim to show whether the independent markets assumption of both standard and new trade models holds for the UK firms. Initially, we group firms in our dataset in terms of their export switching status. We classify a firm as a starter, stopper, or a continuer, where a starter firm is a firm that begins exporting in a given year, and a firm that stops exporting in a given year is classified as a stopper. All other firms (continuing exporters and non-exporters) are considered as continuers. We aim to explore whether a firm entering the export market reduces its domestic sales compared to export stoppers and continuers, by estimating the following equation:

$$\Delta \ln(\text{ExportSales})_{it} = \alpha_0 + \alpha_1 \Delta \ln(\text{ExportSales})_{it} + \alpha_2 X_{it} + d_t + d_s + d_r + u_{it} \quad (2)$$

where  $\Delta \ln(\text{ExportSales})_{it}$  and  $\Delta \ln(\text{ExportSales})_{it}$  represent the growth figures for foreign and domestic sales respectively.  $\alpha_1$  shows the correlation between the growth rate of domestic sales and export sales, while  $X_{it}$  contains some firm-specific, time varying, characteristics, such as the growth rate of tangible assets, and the growth rate of number of employees. Firm-level productivity growth is another factor that potentially has an effect on both domestic and foreign sales of a firm. Thus, we include it in our analysis in all specifications.

Table 3 shows that  $\alpha_1$  is negative for all specifications, and significant in specifications 2 and 4. In other words, both Pooled OLS and fixed effect estimations suggest that the growth rate of sales in the domestic and export markets for continuing exporters are negatively correlated, which contradict the independent markets assumption of both standard and new trade models.

We also conduct the same analysis for each industry by estimating equation (2.10) based on 2-digit UK SIC codes. Table 4 shows that for some industries, such as Coke/Chemicals, Basic/Fabricated Metals,

Machinery/Equipment, Motor Vehicles/Parts, and Other Transport,  $\alpha_1$  is negative and significant. So the growth rates of sales in the domestic and export markets are negatively correlated, and this raises doubts about the constant marginal costs assumption of both the standard and new trade models.

**Table 3:** Export-Domestic Sales Trade-off (Dep.Var: Growth Rate of Export Sales)

	(1)	(2)	(3)	(4)
Growth Rate of Domestic Sales	-.01003 (.0110)	-.0496 (.0115)***	-.0053 (.0103)	-.0662 (.0142)***
Growth Rate of Productivity	.3169 (.0244)***	-.3106 (.0240)***	-.3014 (.0185)***	-.2996 (.0159)***
Growth Rate of Tang. Assets	.02968 (.0035)***	.0161 (.0032)***	.0282 (.0035)***	.0177 (.0029)***
Growth Rate of Employment		.5327 (.0349)***		.5303 (.0305)***
constant	.777 (.0362)***	.0723 (.0297)**	.0037 (.0091)	.0079 (.0084)
year dummies	yes	yes	yes	yes
region dummies	yes	yes		
Sector dummies	yes	yes		
Firm FE	no	no	yes	yes
N. of obs.	14813	14813	14813	14813

Robust s.e. in brackets. \* indicates significance at the 10%, \*\* at the 5% and \*\*\* at the 1% levels

The observed negative relationship between domestic and foreign sales for the UK manufacturing firms could be explained via the correlation between domestic and foreign demand shocks. In other words, if there is a negative correlation between the demand shocks, then it may result in a negative relationship between domestic and foreign sales, even though the firm produces at a constant marginal cost. However, for the UK firms, a negative correlation between domestic and foreign demand shocks seem implausible, given that the UK manufacturing firms have close trade relationships with European countries (BIS, 2010). Hence, we believe this is best explained by the existence of increasing marginal costs.

## CONCLUSION

In this paper, we have revisited the predictions of Melitz (2003) who suggests that more productive firms self-select to enter the export market. Initially, we used a dataset where all industries are pooled, and showed that more productive UK firms do self-select for the foreign market, if we do not consider the sunk cost of export, as many of the UK based studies do. However, we also showed that when we consider the sunk cost of export, which is represented by the previous year's export status in the model, our findings do not confirm the self-selection hypothesis.

**Table 4: Export-Domestic Sales Trade-off - Industries (Dep.Var: Gr. R. of Export Sales)**

Industry	Growth of Dom.Sale	Growth of Productivity	Growth of Tang. Assets	Growth of Empl.	Number of Obs.
Food/Beverages/Tobacco	.0329 (.0249)	.5828 (.0799)***	.0173 (.0285)	.3501 (.0378)***	1089
Textiles/Cloth/Leather	.2254 (.1289)*	.2604 (.0775)***	.1398 (.0631)**	.8866 (.3301)***	440
Wood Products	.0112 (.0111)	.3109 (.0966)***	.0694 (.0254)***	.4840 (.1438)**	77
Paper/Printing	-.0167 (.0301)	.3483 (.1099)***	.0715 (.0264)**	.3927 (.0901)***	774
Coke/Chemicals	-.0737 (.0349)**	.3557 (.0503)***	.0690 (.0273)**	.3204 (.0790)***	2685
Rubber/Plastic	-.0257 (.0205)	.3483 (.0503)***	.0209 (.0188)**	.6698 (.1417)	1120
Non-metal Minerals	-.0217 (.0357)	.2982 (.0854)***	.0355 (.0353)	.5184 (.1316)***	322
Basic/Fabricated Metals	-.0404 (.0158)**	.2481 (.0376)***	.0244 (.0302)	.6158 (.0665)***	2571
Machinery/Equipment	-.0823 (.0285)***	.3474 (.0651)***	.0278 (.0373)	.6525 (.0999)***	1779
Office Equipment	-.0701 (.0363)*	.5041 (.1089)***	.0187 (.0410)	.5368 (.1507)***	507
Electrical machinery	-.1069 (.0648)	.3230 (.0818)***	.0401 (.0258)	.4907 (.1111)***	823
Motor vehicles/parts	-.0723 (.0420)*	.2223 (.0566)***	.0054 (.0390)	1.007 (.3322)***	472
Other transport	-.1520 (.0512)***	.2058 (.0548)***	-.0162 (.0569)	1.128 (.1372)***	424
Other manufacturing	.0427 (.0174)**	.3545 (.0621)***	.0042 (.0097)	.3934 (.0557)***	1730

Robust s.e. in brackets. \* indicates significance at the 10%, \*\* at the 5% and \*\*\* at the 1% levels

Then, we ran the same analysis for each industry, showing that self-selection occurs in some industries, Textiles/Cloth/Leather and Other Manufacturing, while we found that less productive firms self-select to enter the export market in some other industries, such as Non-Metal Minerals and Motor Vehicles/Parts.

Second, we showed that this evidence against self-selection can be best explained by the existence of increasing, rather than constant, marginal costs. We find that the average levels of sales growth in domestic and foreign markets are negatively correlated in many UK manufacturing industries, and to the best of our knowledge this is the first study examining this for the UK industries. This negative correlation suggests that optimal output levels in each individual market are not independent of the other markets for firms in some industries, and this raises doubts about the constant marginal costs assumption of both the standard and new trade models.

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## **Auditor Reputation, Auditor Independence and the Underpricing of IPOs**

**Anna Lin, Kai Chen, and Dona Siregar\***

### **ABSTRACT**

We investigate the effect of auditor's reputation and independence on IPO underpricing. Auditor reputation and independence may reduce asymmetric information that exists between companies and external investors. Multi-variable regression analysis of a sample consisting of IPOs around SOX during the period of July 2000 – July 2004 is performed. Results show that auditor independence does, but auditor reputation does not, reduce IPO underpricing.

### **INTRODUCTION**

The goal of this study is to determine an auditor's reputation effects on the underpricing of IPOs during the period from July 2000 to July 2004. The pricing of an IPO determines the amount of capital a company would receive when they go public. Underpricing affects the company mainly because it means that they receive less money. Furthermore, underpricing indicates that their price is less than their actual market value, which would understate the financial position of the company and put them in a less favorable light in the potential investors' perspectives. As for the auditor, they play an important role in verifying the financial statements that would be evaluated by the underwriter (also known as the investment banker) to determine the pricing of the IPO. In addition, investors heavily rely on the information provided by the company's financial statements; and it's important that the auditor efficiently discloses an opinion that expresses whether the financial statements reasonably and accurately depicts the company's current financial position. The more reasonable assurance the auditor gives (giving an unqualified opinion), the less asymmetric information there is, and the more efficient the market is.

In this study, three hypotheses are developed that involve the main components of the relationship of auditor reputation and IPO underpricing. The three components are the auditor reputation, auditor independence and SOX. Generally, these factors would reduce the asymmetric information of IPO firms. Thus, it is expected that there is a negative correlation between each of the factors (the average auditor reputation ratio, auditor independence ratio and SOX indicator) and IPO underpricing.

The results of this study demonstrate that auditor reputation is negatively correlated with underpricing, although not statistically significant. Secondly, auditor independence has a negative relationship with underpricing and is significant at the 5% level. This suggests that auditor independence reduces asymmetric information of IPOs. Lastly, SOX has a negative relationship with underpricing.

The remainder of this article is as follows. Section 2 provides the literature review, which discusses the articles that support the various variables that influence the relationship between auditor reputation and underpricing of IPOs. Section 3 discusses the hypotheses that are developed and tested in this study.

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Section 4 explains the regression model that will be used to determine the relationship. Section 5 describes the data sources and methodology of the study. Section 6 analyzes the results from the regression model. Section 7 presents the conclusions of the study.

## LITERATURE REVIEW

Auditor reputation is the corporate image that the firm creates over time by its brand name, perceived audit quality, and quality of staff (Aronmwan et al., 2013). Kinney (1986) suggests the demanded auditing services will be heterogeneous due to the nature and extent of costs that firms are willing to pay to minimize costs that would arise from conflicts of interests. This heterogeneity causes CPA firms to invest in reputation capital to differentiate themselves and facilitate the attestation function. Reputation capital is the quantitative value of the firm's reputation. Since their reputation capital decreases through the ex post revealed errors or misstatements, auditors are motivated to report deviations from the applied accounting framework and principles (Palmrose, 1986).

There is a positive relationship between higher reputation and higher audit fees because higher audit fees equate to a greater number of auditing hours. Those higher audit fees and greater number of hours cause an increase audit quality for the auditor (Moizer, 1997). Therefore, there is a positive relationship between auditor reputation and audit quality. Also, it is found that there is a marginal benefit of firms selecting a more reputable audit firm to participate in the IPO process. There is an increase in the price obtained by the firm going public (Beatty, 1989). For example, since auditors with more prestigious reputations charge higher fees, the marginal cost will outweigh the marginal benefit for lower-quality firms, therefore, they tend not to employ more prestigious auditors' services (Michaely and Shaw, 1995). Titman and Trueman (1986) supported that a firm with better value will more likely select a higher-quality auditor than a firm with that is less valuable. Furthermore, they state that the higher quality of auditor chosen will lead to higher level of audit quality and a greater assessment of the firm's value. Therefore, the amount of revenues an auditor made for the year can help determine the auditor's reputation relative to its competitors.

External auditors are crucial in providing reasonable assurance to companies' financial statements. Due to their objectivity, independence and expertise, investors heavily rely on the auditors to verify that a company's financial statements do not contain any material misstatements that would have an impact on their business decisions. A big factor of auditor reputation and independence is the size of an audit firm. Salehi and Mansoury (2009) state larger audit firms tend to have a reputation to safeguard assets and will more likely provide an independent quality service. They have better financial resources, superior technology and more proficient employees than smaller audit firms do, which puts them in an advantage to engage in larger company audits. Also, due to the advantage of having better resources, larger audit firms have a bigger variety of clients and would be less inclined lose their independence to please a client. To measure auditor independence, Krishnamurthy, Zhou and Zhou (2006) utilized the audit fee ratio, which is audit fees divided by total fees. A lower audit fee ratio indicates a lack of independence and vice versa. The reasoning of the statement is that audit firms would be less independent if they provided more services

other than auditing, such as taxes. Before the enactment of the Sarbanes–Oxley Act of 2002, accounting firms were allowed to provide consulting and auditing services to the same client during the same period. If the client doesn't perform well and it shows in their financial statements, accounting firms would fear that their consulting services would be terminated. Since consulting services produce a lot of revenue for accounting firms, they couldn't afford to lose their clients. Thus, they could use their auditing services to put their client in a better light and this jeopardizes their independence.

More prestigious auditing firms tend to provide services for IPOs that are larger, have more tangible assets and collaborate with more prestigious underwriters (Michaely and Shaw, 1995). A model was developed by Titman and Trueman (1986) that demonstrates the firm's motivation to signal the quality of the selected underwriter or auditor for the IPO. Furthermore, the investment banker prefers a higher-quality auditor to prevent mispricing and preserve its reputation (Balvers, McDonald and Miller, 1988). Therefore, underwriter reputation has a positive relationship with auditor reputation because both of their reputations help reduce underpricing (Titman and Trueman, 1986). However, if either one of their reputations reach higher levels, then the other firm's (being the underwriter or auditor) impact on diminishing underwriting decreases (Balvers, McDonald and Miller, 1988).

When there is an excess demand, underwriters can decide to whom they will allocate shares to. Usually, they favor regular investors who provide information about their demand which will be useful in pricing an IPO. They do this to reduce the average amount of underpricing, causing an increase of the expected proceeds to issuers (Loughran and Ritter, 2004). This demonstrates how underwriter discretion can be utilized to benefit issuing firms (Sherman and Titman, 2001). Generally, the regular investors that are approached by the underwriters in these situations are well-informed and understand the importance of the audit reports. There is a possibility that auditor reputation will influence how they perceive the reliance and accuracy of the financial statements of a firm and therefore, possibly influence their perceived demand on the company's IPO. Thus, it is important to incorporate the average underpricing in the previous month to potentially show the effect of an auditor's reputation on the demand and pricing of an IPO.

Asymmetric information regarding an IPO has an effect on underpricing. Carter and Manaster (1990) found that potential investors have substantially less information regarding the IPO than the owners of the company. Current owners have an incentive to misrepresent the company to potential investors, considering that the law doesn't require firms to fully disclose information. It can lead to potential returns based on inaccurate or incomplete disclosures, which can be substantial and cause potential investors to question the validity of information regarding IPOs (Cohen and Dean, 2005). It is important to have less asymmetric information regarding the IPO to increase the efficiency in the market.

It is found that firm value is an increasing variable of auditor and investment banker quality (Titman and Trueman, 1986). Therefore, the current financial position of a company that is going public will influence the quality of the audit.

A huge influence on auditor reputation is the events that resulted in the passing of the Sarbanes-Oxley Act (SOX) of 2002. The purpose of SOX is to enhance the accuracy and reliability of a firm's financial

statements and to reduce information risk. The indictment of Arthur Andersen leads to a negative market reaction towards the clients of Andersen (Krishnamurthy, Zhou and Zhou, 2006). However, after the passing of SOX, the Securities and Exchange Commission (SEC) heavily enforced SOX which resulted in positive, abnormal returns in the market (Li et al., 2008). The negative reactions before SOX are more significant if the auditor's independence appears to be compromised. Overall, it is determined that auditor reputation and independence have a significant impact on perceived audit quality and credibility of financial statements which is priced by the market (Krishnamurthy, Zhou and Zhou, 2006). Moreover, SOX improves auditor independence, but it is found that there isn't any actual auditor independence lost before the passing of SOX (Chung and Kallapur, 2003).

Butler et al. (2014) apply five different methodologies to identify the strongest influences on the pricing of IPOs. The five methodologies are the extreme bounds approach, the best subset approach, the least absolute shrinkage and selection operator approach, the weighted average least squares approach, and the Bayesian Model Averaging approach. They discover that information regarding previous IPOs does affect the current IPO underpricing. The results of the study are that offer price revision, average underpricing in previous month, leverage and prior 30 day CRSP (Center for Research in Security Prices) equal weight index return influence the underpricing of IPOs the most. The prior 30 day CRSP return suggests the equity market conditions at the time the firm goes public is reflected by the underpricing of IPOs in that current period. These factors will be used as control variables in the regression model.

## **HYPOTHESIS DEVELOPMENT**

Three hypotheses are tested to understand the relationship between auditor reputation and the pricing of IPOs. First, an auditor with a favorable reputation would reduce the asymmetric information of IPO firms. Thus, it is expected that there is a negative relationship between the average auditor reputation ratio and IPO underpricing. The average auditor reputation ratio quantifies auditor reputation and allows us to measure how the extent of an auditor's reputation impacts the IPO underpricing.

The second component that is addressed is the relationship between the auditor's independence and the underpricing of IPOs. It is predicted that the use of an independent auditor would reduce the asymmetric information of IPO firms. Thus, it is expected that there is a negative relationship between the audit fee ratio and IPO underpricing. The audit fee ratio measures the auditor's independence, which is another important factor in the quality of an audit.

The third hypothesis is SOX would reduce the asymmetric information of IPO firms. Thus, it is expected that the SOX indicator has a negative effect on the IPO underpricing. As mentioned previously, many frauds occurred prior to the passing of SOX. In this study, it is important to determine whether the passing of SOX gave more credibility to auditors and financial statements and how it would impact the pricing of underpricing.

## MODEL

The regression below is the model that is used in this study to determine the relationship between the auditor reputation and IPO underpricing.

$$U = \beta_0 + \beta_1 AR + \beta_2 AI + \beta_3 SOX + \beta_4 (SOX*AR) + \beta_5 (SOX*AI) + \beta_6 IB + \beta_7 S + \beta_8 L + \beta_9 OP + \beta_{10} AU + \beta_{11} CRSP + \varepsilon$$

Where:

U = Underpricing

AR = Auditor Reputation

AI = Auditor Independence

SOX = SOX Indicator

IB = Investment bank Reputation

S = Log(SIZE)

L = Leverage

OP = Offer Price Revision

AU = Average Underpricing in Previous Month

CRSP = Prior 30 Day CRSP Equal Weight Index Return

$\varepsilon$  = residual

This study mainly tests the auditor reputation, auditor independence, SOX indicator, SOX indicator\*auditor reputation, and SOX indicator\*auditor independence in the regression model. The rest of the regression consists of control variables that are factors in underpricing.

## DATA AND METHODOLOGY

### 5.1 DATA

For the period from July 2000 to July 2004, there are 447 IPOs. First, to measure auditor reputation, the average auditor reputation ratio is developed. The auditor reputation ratio is the audit fees of the IPO divided by the number of planned shares multiplied by the offer price. Since each auditor audited multiple IPOs, the ratios are averaged together to get the average auditor reputation ratio. As previously mentioned in the literature review, audit fees are a good indicator of the auditor's reputation. The denominator of the ratio (number of planned shares times the offer price) takes into account that audit fees are influenced by the size of the IPO and would depict an accurate measure of the auditor's reputation, regardless of the size of the IPO. The higher the ratio, the more reputable the auditing firm is. The offer price of the IPOs, along with the dates of the IPOs, the average underpricing in previous month, and the underwriters chosen to participate in the IPOs are collected from the IPOScoop database. The audit fees and number of planned shares data is derived from the DEF 14A and S-1 forms, respectively, from the Securities Exchange Commission (SEC) Edgar database. The DEF 14A form is the proxy statement that is released to shareholders and states the audit and total fees that the auditor charges the firm for the stated year. The S-1 form is the registration form of the IPO that is required to be filed to the SEC to formally start the process of going public. The form also contains information regarding the auditor selected to provide services in the IPO, liabilities and equities of the IPO (to get the leverages) and the initial price range. The initial price

range is used to find the offer price revision. The equation of the offer price revision is the offer price minus the midpoint of the initial price range, divided by the midpoint of the initial range.

To measure the degree of auditor independence, the audit fee ratio is utilized. The audit fee ratio consists of audit fees divided by the total fees. The higher the ratio, the greater the degree of auditor independence.

To find the percentage of underpricing of each IPO, the offer price is subtracted from the closing price and divided by the offer price. The closing price is the market price for which is the IPO's market value. As for underwriter reputation, the data from the study conducted by Loughran and Ritter (2004) is utilized. Loughran and Ritter retrieved the data from the Thomson Financial Securities Database and used the Carter and Manaster ranking and Carter, Dark, and Singh ranking to rank underwriter reputation. They created rankings for the period from 1980 to 2015 and divided that period into smaller periods. The 2001 – 2004 period rankings are selected given that they pertain to the period for my study. Loughran and Ritter ranks the underwriters on a scale from 0 to 9. Any underwriter that receives a ranking of 8.0 to 9.0 are the most prestigious underwriters. Those that have a ranking of 5.0 to 7.9 are considered to be quality regional or niche underwriters. Lastly, underwriters that have a ranking of 0 to 4.9 are generally associated with penny stocks. Also, many of those with a rank of 3.0 or lower have been charged by the SEC with market manipulation (Loughran and Ritter, 2004). The size of the firms going public are retrieved from COMPUSTAT. From the data from COMPUSTAT, there were a few leverage ratios that were negative or above 1. As for size, it is measured by the book value of the firm's assets. Lastly, the prior 30 day CRSP equal weight index return is retrieved from the Center for Research in Security Prices database.

## 5.2 DESCRIPTIVE STATISTICS

Table 1 presents the summary of statistics for pre-SOX and Table 2 for post-SOX. Table 3 presents the differences in the value of variables between pre-SOX and post-SOX.

**Table 1:** Summary of Statistics for Pre-SOX

	MEAN	STANDARD DEVIATION	MINIMUM	MAXIMUM	N
Underpricing	0.248	0.416	-0.331	2.121	312
Auditor Reputation	1499.4	912.3	601.1	10636.8	312
Auditor Independence	0.325	0.230	0.032	1	243
Underwriter Reputation	7.336	2.922	.001	9.001	310
Log of Book Value Asset	5.277	1.476	0.962	10.929	306
Leverage	0.298	0.276	0.007	2.821	306
Average Underpricing Previous Month	0.288	0.206	0.052	0.617	278
Offer Price Revision	-0.005	0.118	-0.375	0.462	312
Value Weighted 30 Days Prior IPO	-0.002	0.062	-0.139	0.269	320

**Table 2:** Summary of Statistics for Post-SOX

	MEAN	STANDARD DEVIATION	MINIMUM	MAXIMUM	N
Underpricing	0.117	0.178	-0.155	1.036	154
Auditor Reputation	4075.4	3035.3	247	28686.9	156
Auditor Independence	0.713	0.279	0.144	1	149
Underwriter Reputation	7.928	1.709	0.001	9.001	151
Log of Book Value Asset	5.185	1.496	0.188	10.145	152
Leverage	0.3561	0.3322	0	2.113	152
Average Underpricing Previous Month	0.188	0.067	-0.027	0.259	157
Offer Price Revision	-0.043	0.116	-0.5	0.158	154
Value Weighted 30 Days Prior IPO	0.025	0.050	-0.105	0.159	157

The mean of underpricing in the pre-SOX period is 24.8% and 11.7% in the post-SOX period. Therefore, the mean of underpricing has decreased once SOX was enacted. This decrease in the mean is statistically significant at the 1% level (Table 3). On the other hand, the means of auditor reputation and auditor independence have increased, indicating that SOX had a positive impact on the auditors.

**Table 3:** Comparison of Pre-SOX and Post-SOX Summaries of Statistics

	Difference in Means (Pre-Sox – Post-SOX)	t Stat	P value
Underpricing	0.130	3.72	0.000***
Auditor Reputation	-2576	-13.81	<0.001***
Auditor Independence	-0.388	-14.89	<0.001***
Underwriter Reputation	-0.592	-2.3	0.020**
Log of Book Value Asset	0.092	0.62	0.530
Leverage	-0.058	-1.97	0.050**
Average Underpricing Previous Month	0.171	10.06	<0.001***
Offer Price Revision	0.039	3.33	0.001***
Value Weighted 30 Days Prior IPO	-0.027	-4.75	<.001***

\* significant at the 1% level , \*\* significant at the 5% level, \*\*\* significant at the 10% level

## EMPIRICAL RESULTS

The first regression tests the relationship between the underpricing of IPOs and auditor reputation (Table 4, column 1); the second regression tests the relationship between underpricing and auditor independence (Table 4, column 2); and the third regression tests the relationship between the underpricing and the enactment of SOX (Table 4, column 3). In the first and third regressions, the variable, SOX\*average auditor reputation ratio, is incorporated to see if the interaction of the two variables, SOX and average auditor reputation ratio, affects the underpricing. The same applies to the SOX\*auditor independence variable except that it is incorporated into the second and third regressions rather than the first, since the first regression is only testing auditor reputation.

**Table 4:** Regressions of Auditor Reputation, Auditor Independence and SOX

	UNDERPRICING AND AUDITOR REPUTATION (1)	UNDERPRICING AND AUDITOR INDEPENDENCE (2)	UNDERPRICING, AUDITOR REPUTATION, INDEPENDENCE AND SOX (3)
Intercept	0.259*** (0.00)	0.264*** (0.00)	0.318*** (0.00)
Auditor Reputation	-0.000 (.78)	-	-0.000 (0.29)
Auditor Independence	-	-0.179** (0.04)	-0.171* (0.05)
SOX	0.014 (0.82)	-0.064 (0.40)	-0.093 (0.31)
SOX * Auditor Reputation	-0.000 (.990)	-	0.000 (0.39)
SOX * Auditor Independence	-	0.145 (0.23)	0.139 (0.26)
Underwriter Reputation	-0.003 (0.62)	-0.002 (0.83)	-0.002 (0.79)
Log of Book Value Asset (Size)	-0.012 (0.31)	0.002 (0.88)	-0.001 (0.96)
Leverage	-0.090* (0.08)	-0.107** (0.04)	-0.103* (0.06)
Average Underpricing Previous Month	0.235*** (0.01)	0.201** (0.04)	0.193* (0.05)
Offer Price Revision	0.863*** (0.00)	0.835*** (0.00)	0.841*** (0.00)
30 Days Prior IPO (CRSP Return)	0.027 (0.91)	-0.029 (0.91)	-0.034 (0.89)

\* significant at the 1% level , \*\* significant at the 5% level, \*\*\* significant at the 10% level

The first regression of underpricing and auditor reputation (Table 4, column 1) and the third regression of underpricing, auditor reputation, independence and SOX (Table 4, column 3) show that auditor reputation has a negative relationship with the underpricing of IPOs. The negative relationship found does support the hypothesis that predicts the auditor reputation is negatively correlated with underpricing. However, in both regressions, the results indicate that the negative relationship between auditor reputation and underpricing are not statistically significant. The significance of the relationship between auditor reputation and underpricing might be due the fact that there is only a small range of auditor reputations in the sample. It might be more significant if there is a wider range of auditors and more mid-size or small auditors providing services to more IPOs. As for the results for auditor independence, the second regression of underpricing and auditor independence (Table 4, column 2) shows a negative and significant relationship at the 5% level. In the third regression, the auditor independence and underpricing relationship is negative, again; however, it is only significant at the 10% level. These results support the second hypothesis that predicted a negative relationship between underpricing and auditor independence.

In the second and third regressions, SOX is negatively correlated with underpricing. These results support the third hypothesis, but do not have statistical significance. It is also found that the variable, SOX\*auditor reputation, is positive, but not significant in the first and third regressions. Lastly, the SOX\*auditor independence is also positive and not significant in regressions 2 and 3.

Overall, underpricing and auditor independence have a negative relationship at the 5% significant level and underpricing and SOX have a negative relationship at the 1% significant level. Therefore, when there is an increase in auditor independence, asymmetric information decreases and market efficiency increase. Auditor independence is an influential factor in the underpricing of IPOs and is something that IPOs should take into deep consideration when selecting an auditor. Auditor reputation has the same effect; however, it does not have the significant influence on underpricing where it could be consider has a factor of the pricing of IPOs.

## CONCLUSIONS

The objective of this study is to evaluate the relationships of auditor reputation, auditor independence and the enactment of SOX with the underpricing of IPOs during the period from July 2000 to July 2004. The results of this study demonstrate that auditor reputation negatively correlates with underpricing, but it is not statistically significant. SOX has a negative relationship with underpricing in all regressions. Lastly, auditor independence is found to negatively correlate with underpricing and it is statistically significant at the 5% level. Future researchers can improve the methodology by excluding Arthur Andersen IPOs from the sample and expanding the sample period. In addition, future researchers may consider incorporating auditor independence into their models when testing the underpricing of IPOs.

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## **Poverty in India and the Role Energy Plays: How the Energy Sector Helps and Hinders Rural India**

**Babita Srivastava\***

### **ABSTRACT**

The struggle for widespread electrical power plays into a feedback loop of poverty in India. While it is one the government has begun to openly acknowledge, it remains an unsolved issue. For India to resolve its poverty problem it must first overcome its power problem. While strides of significant value have been made towards solving India's power crisis, a shift in approach may be necessary in order for India to compete economically, all while allowing the average quality life of its individual citizens to improve dramatically.

### **INTRODUCTION**

To understand the value of power to any given citizen, not just Indian citizens, one should first examine the way power bottlenecks access to many modern utilities. Some of the simplest of these utilities come in the form of electrical lights and heating. Without access to these important utilities, citizens may face major issues such as freezing to death, suffering serious heat stroke, or losing vital food due to a lack of refrigeration. At the lower end of the spectrum of energy consumption is the simple use of smartphones, which has become a necessity not only for day to day life but also to run a business or connect with others at a global level. With this dependency on electronics and electricity, the rise of energy consumption is understandable and the need to have dependable energy sources is an absolute must for any nation, and that is especially the case for India.

### **INDIA'S ENERGY ADVANCES AND SHORTFALLS**

The need for a change in the area of energy and fuel sources has been apparent for many years but becomes more and more urgent as time goes on. Beginning in the 1970s with an embargo on oil enacted by Arab states a part of the Organization of Petroleum Exporting countries (OPEC), causing a detrimental impact on the United States and its economy, the rest of the world started to pay attention to the types of fuel sources being used and how it could be improved upon (Osmani, 2014).

Learning from example, India has implemented plans for updating their resources in order to become less dependent on nonrenewable fuel sources and move toward more sustainable energy technology. Starting in the 1980s India began to construct an institutional framework to promote the country's development of renewable energy. This switch includes being less reliant on harmful, non-sustainable energy sources such as oil, coal, and natural gas, and adopting measures to create alternative fuels like

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hydrogen, bio-fuels, and synthetic fuels as well as technology to generate energy through bio, hydro, solar, geothermal, and tidal energy resources and plants.

The capacity and generation for sources such as coal, oil, or gas follow a downward trend from 2012 to 2017 with a prediction of an even greater loss of popularity in 2030 (Osmani, 2014, p. 42). Hydro, renewables, and nuclear energy do not show this same pattern. They have, and are predicted to rise in percentage of capacity as well as generation.

To aid this effort in 1981, the Indian government created “the Commission for Addition Sources of Energy... aimed to promote the development of renewable energy technologies for use in the different sectors of the country” (Osmani, 2014, p. 42). From this came the Department of Non-Conventional Energy sources in 1982 and was later expanded to be the Ministry of Non-Conventional Energy Sources (MNES), now Ministry of New and Renewable Energy (MNRE), in 1992. With this, India was officially the first country in the world to have formed a Ministry for this effort. The need for a shift in attention away from nonrenewable energy sources is pressing and still, India must increase their focus on implementing renewable energy sources.

### **INDIA’S ENERGY CRISIS**

India’s energy supply, on its current course, is estimated to be rising by about 1% per year. Meanwhile its energy consumption is estimated to rise by about 6.8% a year (Bohi & Toman, 1993). It should be noted the rise in energy consumption is arguably a benefit, as the average citizen presently uses a miniscule amount of energy compared to most developed nations (Wilson, 2011).

Even though they make up 18% of the world population, it uses only 6% of the world’s primary energy resources. India will never be able to develop its own energy in such a way allows it to keep up along with the rest of the world’s resources and simply cannot mimic use seen in places like Canada or the United States. They must find an alternative and readily available resources instead, for their current course is unsustainable.

This puts India in an energy crisis, as it already cannot power much of its citizen base. With a substantial growth in population from 1974 to 2005, India’s urban poor grew from 60 million to 80.8 million (Yenneti, Wei, & Chen, 2017). India’s currently population sits at 1.3 billion in rising, beaten out only by China (which has a greater landmass). The need for energy therefore presents a challenge of scale to the Indian government. Without careful planning, India will either be unable to keep up with its energy needs or will hit a catastrophic end in energy production if it builds an energy sector too heavily reliant on nonrenewable energy.

### **INDIA’S OVERRELIANCE**

India is over reliant on nonrenewable energy. Coal, natural gas, and oil power facilities make up the vast percentage of energy production in India. India is not completely without renewable energy however.

As shown in Table 1, hydroelectricity makes up about 14% of India's energy production, and then renewable energy from other sources makes up another 17%.

**Table 1. Current Energy Use in India**

<b>Fuel</b>	<b>MW</b>	<b>%</b>
Total Thermal	220,569.88	67
Coal	194,402.88	59
Gas	25,329.38	8
Oil	837.63	1
Hydro (Renewable)	44,594.42	14
Nuclear	6,780.00	2
RES** (MNRE)	57,260.23	17
Total	329,204.53	100

\*\*Renewable Energy Sources (as reported by the Ministry of New and Renewable Energy) Government of India Power Sector. (2017).

Though hydroelectricity is relied on for a small portion of India's energy use, it is not a perfect solution. One limitation of hydroelectricity is that it is highly location dependent, with some areas simply unable to be powered effectively or efficiently via water. India however is highly sunlight rich, with most areas of India reaching at least 2000 hours of sunlight a year and some topping over 3000 (especially in the west). It an increasingly viable option considering "The solar energy received by Earth is more than 15,000 times the world's commercial energy consumption and over 100 times the world's known coal, gas and oil reserves," has endless potential (Ministry of New and Renewable Energy, 2009, p. 8) With solar radiation levels of 4 to 7 watts/square meter stretching across India, the potential power generation for solar energy amounts to about 20 MW/sqkm (Sharma 2011). Therefore, this may indicate that solar power would prove a highly effective solution to India's energy crisis.

Additionally, to be commented on, is that India's coal supply is simply limited and of low quality. Investment in coal and other nonrenewable energy sources is, in many cases, simply a waste of government resources. Global energy consumption is at a consistently high level and growing (Vlachogianni, T. , & Valavanidis, A., 2013). The fact remains that all nonrenewable energy sources are limited in supply to some extent. Over investment in plants that rely on these sources requires often significant damage to the nearby environment to extract them and generally disregards the economic reality that long-term these energy solutions do not work for powering India. The fuel sources will run out and, before that, over investment will quicken the pace of global warming, which represents an entirely different set of dangers to the Indian economy and people.

## **REASON FOR RENEWABLE ENERGY IN INDIA**

The benefits of a massive solar energy overhaul in India are numerous. Beyond the pollution involved in manufacturing, solar energy is essentially a totally clean energy source. Energy is gathered from the sun and that energy is converted into electricity with no additional fuel required. Additionally, solar energy is basically infinite in supply. India has more than enough landmass and hours of sunlight to energize its entire population with excess, if modern facilities were efficiently and effectively laid out. India's Present Total Generation Capacity is about 210 GW but moving forth with plans to install more solar plants, India could build 1,000 GW of solar generators on just 0.5% of its land. (Yadav, 2013).

One potential method of powering Indian urban areas more effectively could be one of a decentralized solar grid. Rather than powering cities via nearby plants, proper urban planning could instead have solar panels installed directly on top of most urban buildings further increasing efficiency and reducing the strain on a grid by spreading the generation very widely rather than the more traditional, and much denser, plant based system. (Yadav, 2013). Worth mentioning is that this method of generation will prove more difficult for divisions of India that were developed without quality urban planning, low population areas (especially rural regions), and places in which power siphoning is a major concern (as it is in many areas). In areas where installation directly into buildings may prove expensive, calculations will need to be done to determine the viability of locally installed solar paneling versus the construction of a nearby plant.

Although, it should be noted these systems of solar power generation can work in tandem to power a community (Yenneti, Wei, & Chen, 2017). The issue of power siphoning is a more difficult one, likely the result of a culture amongst some citizens and even communities that view such siphoning as not particularly unethical. Of note however is that the more widely and cheaply energy is available to the Indian population, the less likely such siphoning is to occur. (Yenneti, Wei, & Chen, 2017) The risk of criminal charges and inconvenience of an illegal siphoning setup eventually would outweigh the benefit of illegally free power.

## **GOVERNMENT INTERFERENCE**

Although the Indian government has set more reasonable renewable energy goals for the future, the reality is renewable energy is still viewed as secondary to nonrenewable energy. Economically, this is a short-sighted choice on the part of the Indian government, and one that must be shifted away from in the near future to prevent much more expensive shifts in the far future. To aide in this effort measures have been taken by the Indian government to promote renewable energy development; The Jawaharlal Nehru National Solar Mission (JNNSM) and the REC or Renewable Energy Certificate. As well as the mandate, "State Electricity Regulatory Commissions (SERCs)... to purchase a certain percentage of power from renewable energy sources" as a renewable purchase obligation (RPO) (Council on Energy, Environment and Water, p. 1).

Ignoring the obvious limitations on nonrenewable fuel sources (in that they are by definition, limited and non-replicating), most nonrenewable energy sources burn dirty and pollute the atmosphere. While this is not true of all nonrenewable energy sources, such as with nuclear power, it is true of most. Polluting

sources of energy are seeing a political and social shift that is slow but shouldn't be underestimated. Their use will grow ever more difficult and tense in later decades, and India should be designing for the future, not the present. Additionally, to consider, the world approaches a point of no return regarding pollution and global warming that will prove devastating to the world economy. Renewable power simultaneously helps prevent that worse case outcome while also preparing for it, should it occur. The ability to generate clean power, especially at an excess, is an incredibly valuable ability for a nation in both times of plenty and of extreme want. Once the solar generators are in place, there is virtually no downside to their existence, unlike nonrenewable plants.

### **FINANCIAL RESTRICTIONS LIMITING RENEWABLE ENERGY**

The biggest obstacle with a massive solar energy overhaul in India comes in at cost. While the cost of solar energy has been on a decline, the cost of solar energy can still be significant. It is for this reason that the Indian government has implemented several programs in the hopes of encouraging investment into solar energy. For example, India has vested interest in the Jawaharlal Nehru National Solar Mission (JNNSM) and the ability to get a REC or Renewable Energy Certificate (Ghosh, 2015). The economic reality of powering India via solar power will continue to remain expensive. There is simply no way to completely mitigate the high initial overhaul cost. It should be acknowledged, however, that solar plants can take as little as one year to construct, and require little maintenance. It requires low operational maintenance, is domestic and freely available energy source with zero human displacement, and most state tariffs are already established for this type of energy (Sasikumar & Jayasubramaniam, 2013). Additionally, the millions of green energy jobs such an overhaul would have would generate an astronomical amount of economic growth for India and potentially even an excess could be generated for selling to neighboring nations. With the creation of jobs, there are other positives that would be included. The price of PV cells, or solar panels, per watt has decreased dramatically in years since its production and distribution (Exeoenergy, 2014). With this representation showing such a dramatic downward trend to affordability, this underutilized power source proves advantageous for reasons of installation space, progressive accessibility, and renewability of energy.

The mass overhaul of India's energy sectors towards solar energy would thus support poor populations in multiple ways. To start, the generation of millions of green energy jobs and within the field of technology and engineering would help reduce unemployment and potentially allow lower income citizens to become proficient in skills related to a field, such as solar energy, that will likely remain useful and relevant, at least for the coming decades. Second, the ability to produce power without the need for fuel, especially in excess of the amount of power needed for a community, could result in cheaper power for all citizens. From a study in 2013, Cleetus posits, "growth in renewable energy industry creates positive economic 'ripple' effects. For example, industries in the renewable energy supply chain will benefit, and unrelated local businesses will benefit from increased household and business incomes." More affordable energy also allows for more abundant access to impoverished areas who will now be able to utilize its benefits. In turn, promoting wider

use of power, the purchasing of more utilities that rely on power, and stimulation of economic growth. This boost in industry is in addition to the massive growth that will be government funded towards India's green energy businesses.

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# The Impact of Banking Regulations and Deregulations on the Stock and Housing Market<sup>1</sup>

**Anthony Vecere Jr.<sup>\*\*</sup>**

## **ABSTRACT**

The recent election results have boosted stock market performance. These gains come because of expectations for higher government spending, lower corporate taxes, and a deregulated banking sector. By looking at banking regulations from 1995 to 2017, I assess the effect of changing regulations through movements in stock returns and housing prices. I find that they have a positive impact on stock market returns & volatility, while negatively affecting housing prices. Lastly, I show that deregulations are only somewhat beneficial, which is especially important because there is much debate about whether the government should repeal the Dodd-Frank Act.

## **1. INTRODUCTION**

There are numerous studies and papers which conclude that the deregulation of a country's banking sector is linked to stronger economic growth. Because of the election of Donald Trump as President, many investors are expecting him to go through with his promise of banking deregulations, such as the repeal of Dodd-Frank. This is looking likely, as he signed several executive orders within his first week to make good on policies he discussed on the campaign trail. Some favor the removal of Dodd-Frank capital requirements and proprietary trading restrictions because of the belief that they limit competition and prevent banks from operating at full efficiency (Kroszner and Strahan 2014, Chava, et al. 2013). Despite the importance of growing a country's economy, there is still hesitation over whether we should be using bank deregulations as the means to this end.

Inherently risky market adaptations were born due to the original banking regulations of Basel I and Basel II (Barth, Gan and Nolle 2009, Kroszner and Strahan 2014). The use of pension funds by venture capital firms and the securitization of assets (such as homes) perpetuated a massive unstable market of mortgage-backed securities (MBS) and credit-default swaps (CDS). Because the use of these new financial instruments came about during times of stricter bank regulation to circumvent laws that felt restricting, once Glass-Steagall and other regulations were pulled back the banking sector no longer needed them. However, this "shadow banking sector" continued to operate, which encouraged aggressive lending practices with minimal oversight (McCoy 2008).

The research question that I posit stems from the observations I have highlighted thus far. Banks are large players in both the housing and stock markets – they have expertise in investing the money of companies and people, and they are one of the best tools consumers have when financing their homes.

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For this reason, I have decided to examine whether changing bank regulations correlate with higher stock market returns and higher home prices using various regression models. These models account for regulations with a dummy variable and use data from relevant years (1995-2017) to track the effects of regulations through stock market volatility, changes in GDP and inflation, and various measures of the cost of borrowing.

The most relevant findings which I came across show that imposing banking regulations are a meaningful step towards establishing a more secure banking sector, but that going too far with these can have an adverse effect on financial returns. I draw this conclusion from evidence in Tables (1) and (2), which show that not only is volatility greater under loose regulations, but that it also increases at a faster rate under these conditions. Although uncertainty is typically linked to higher returns, I observe that while volatility is increasing the stock market shows slightly lower returns.

The rest of my paper unfolds as follows: Section 2 summarizes the findings of my primary literature and uses their conclusions to develop a set of hypotheses; Section 3 explains what data I use in testing the hypotheses, why I chose the variables that I did, and constructs baseline regression models that will use the inputs I collected; Section 4 is an empirical look at the outputs of my regressions, as well as an assessment of whether or not the obtained results support or disprove the hypotheses I proposed; Section 5 recaps the steps that I took in conducting my research, provides commentary on how my methods may be improved, and puts forward a conclusion that explains the meaning of my findings; the Appendix contains a brief sample of 2 regulations and 2 deregulations that I used in conducting my research, to illustrate how I represented the 50 policies I collected; Tables (1) and (2) are the preliminary results of my variables; Table 3 displays the results of my regressions.

## **2. RELEVANT LITERATURES AND HYPOTHESIS DEVELOPMENT**

Many people have examined the effects on the economy from banking deregulations. Papers by Kroszner and Strahan (2014) and Chava et al. (2013) have given empirical evidence that deregulation is an important factor in encouraging the growth of economies. While some would argue that there is actually a two-way relationship between the growth of financial systems and the economy, in this paper I will focus on the relationship that exists starting with the loosening of the banking sector (Barth, Gan and Nolle 2009). Despite evidence which aids the arguments of proponents of deregulation, Crotty (2009) and McCoy et al. (2008) place the blame for the financial crisis of 2007 on wide-scale banking deregulations that created an unstable financial system. In addition, Perez-Caldentey and Vernango (2012) and Barth, Gan and Nolle (2009) examine the broader impacts of deregulation by focusing on other parts of the world where they have caused controversial economic events as well.

One way that we have observed volatility in the past, specifically with regards to the financial crisis in 2007, was through the change in housing prices. As deregulations created a massive shadow banking

sector, the housing market was being affected by predatory lending practices and instruments created through MBS's. As banks and investors bought, pooled, resold, and shorted instruments that were tied to inherently risky mortgages, a dangerous system of underpricing risk and overpricing assets resulted in a massive bubble in the housing market that was mostly responsible for the recession that ensued (McCoy 2008). With this being the case, I intend to compare the change in housing prices during regulation periods and deregulation periods to suggest that long-term volatility may be on the rise.

The various arguments surrounding banking regulations ultimately show that they must be present enough to act as a safety net, but not so restricting that they act as an inhibitor to economic progress or a breeding ground for questionable market adaptations. Using this conclusion and those reached by Kroszner and Strahan (2014), McCoy (2008), and Chava et al. (2013), I will argue that the deregulation of the banking sector will preclude parallel increases in stock market performance and instability.

Hypothesis 1: The deregulation of the U.S. banking sector will increase the volatility of financial markets;

Hypothesis 2: The regulation of the U.S. banking sector will decrease the volatility of financial markets;

Hypothesis 3: The deregulation of the U.S. banking sector will increase the returns of financial markets;

Hypothesis 4: The regulation of the U.S. banking sector will decrease the returns of financial markets;

Hypothesis 5: The deregulation of the U.S. banking sector will increase the average price of homes in the United States;

Hypothesis 6: The regulation of the U.S. banking sector will decrease the average price of homes in the United States;

### **3. DATA AND METHODOLOGY**

The main data I am using for my independent variables comes from: the Federal Reserve's list of banking regulations and deregulations; daily numerical data from the VIX, obtained from the Chicago Board Options Exchange (CBOE); US CPI data from the Bureau of Labor Statistics (BLS); 3-month Treasury Bill and the Federal Fund rates from the Federal Reserve Bank of St. Louis; 30-year Mortgage rates from Freddie Mac; and GDP data obtained from the Federal Reserve's Board of Directors. This will all be in the timeframe of 1995-2017 because during this 22-year span, the United States saw many large changes in its bank regulation policy.

Each regulation's lifespan will be its respective "period," and its stricter/looser nature will determine whether it is a "regulation" or "deregulation." By setting the regulations (denoted by a 1) and deregulations (denoted by a 0) together as a dummy variable, I can measure their effects on their respective periods. These results will also echo the cumulative effect from other existing rules because of their overlapping nature.

All of these variables have considerable effects on the dependent variables which I plan to track. Banking regulations/deregulations and VIX numbers describing short-term volatility can seriously influence

the way investors will act in the market and what they choose to do with their money. Inflation will also be included to create comparable stock returns and housing price data. Assuming GDP growth and bank sector growth affect each other as well, it is important to include the change in GDP in chained 2009 dollars (to avoid double-counting the effects of inflation). Lastly, including various interest rate data in Regression (2) is necessary because the changing rates will directly influence the borrowing cost that consumers face when buying homes.

Table 1 presents the descriptive statistics of the independent and dependent variables I outlined. This information tells us the statistical significance of the differences of the regulation period and deregulation period averages and medians. As we see from looking at Table (1), it becomes clear that all the chosen variables show varying degrees of statistical significance. Meanwhile, Table (2) tells a similar story by looking at the differences in their movements.

My results will be shown through Regressions (1) and (2), which track the effects of the independent variables on average housing prices obtained from Freddie Mac (representing volatility and mispriced assets) and returns from the S&P 500 (representing effects on returns). The models that I intend to use are as follows:

$$Stock\_return_i = \beta_0 + \beta_1 regulation\_dummy_i + \beta_2 VIX_i + \beta_3 \Delta GDP_i + \beta_4 Inflation_i + \varepsilon_i \quad (1)$$

$$\Delta House\_index_i = \gamma_0 + \gamma_1 regulation\_dummy_i + \gamma_2 \Delta GDP_i + \gamma_3 Inflation_i + \gamma_4 T\_bill_i + \varepsilon_i \quad (2)$$

Variations of Regression (2) substitute the T-bill data I obtained with other representations of the borrowing cost that could potentially influence the housing index, such as 30-year mortgage rates and the Federal Funds Rate.

#### 4. RESULTS

Table (1) shows that the most significant differences occurred in the VIX, the CPI, and the various measures of borrowing cost. Each of these discrepancies were statistically significant to the 1% margin. What we see in Table (1) is that during times of measured deregulation, the volatility of the stock market was notably higher, which aligns with Hypotheses (1) and (2). This suggests that as banks move towards looser restrictions, they begin engaging in riskier behavior which raises volatility. Table (1) also shows that each of the interest measures were significantly lower during regulation periods, and this could be because the country saw extremely low interest rates during the post-crisis period. As interest rates are low, people will be more inclined to spend their money and invest, which is probably why the country experienced significantly higher inflation during the times where harsher regulations were observed. Other differences in Table (1) also produced significant information, such as the spread between the S&P. This was higher during times of regulation – which is inconsistent with Hypotheses (3) and (4) – and I believe it is because

people feel more confident during periods when banks are limited by tighter regulations. Additionally, it is possible that the relationship between banking regulation and returns is not a linear one. Rather, it is more likely that regulations only dampen returns when they are excessive. If a balance already exists which allows people to feel safe investing their money but does not inhibit competition among banks, imposing more regulations would only promote the latter.

Combining these results with those in Table (2) provides us with an even clearer picture. The difference between housing prices from Table (1) did not produce a statistically significant result, which was inconsistent with Hypotheses (5) and (6). However, the change in housing prices from Table (2) shows that the 31% difference was statistically significant to the 5% margin. This could be due to the deregulations which allowed for the development of a housing bubble. We also see the rise in inflation being greater (and significant to the 1% level) during the deregulation periods even though it was higher on average during the regulation periods, which is represented in Table (1). This suggests that the mispricing of assets born out of deregulations caused a sharper change in the CPI. Lastly, the change in GDP was larger in deregulation times because of the two-way relationship between GDP growth and banking sector growth that is discussed in Barth, Gan, and Nolle (2009).

By looking at Table (3), it is clear that certain factors are consistently relevant. The main one which was always statistically significant is the change in GDP, which makes sense because of the aforementioned effect GDP has on the banking sector and ultimately the housing market. The Federal Funds Rate and 3-month T-Bill rates also appear to be important in determining stock market and housing price outcomes as shown in Table (3). These directly impact how investors choose to place their money. This tells us that as the rates on these two items go down, investors will inevitably turn towards investments that have higher returns, which will perpetuate inflation. My inflation results in Table (3) also support this idea. The negative effect inflation has on the housing market reflects the notion that returns in the housing market are less tempting to investors. Finally, I found that the VIX results from Table (3) were statistically significant to the 5% margin once I included the Federal Funds Rate in Regression (1), causing a rise in stock market returns. The explanation behind this might be that as a looser banking sector becomes more regulated, volatility will also slightly increase because of the need for banks to expose new loopholes. As uncertainty in the stock market rises, we deal with more risk which positively influences stock returns.

The dummy variable for regulations provided some very interesting results in Table (3). It always played a significant role in positively influencing the stock returns measured on the S&P 500, which hints that as we see more regulations come into play, we are essentially creating a better perception of the current state of the stock market – which is inviting to investors. This does not fall in line with Hypotheses (3) and (4).

Although regulations did have a measured impact on stock returns, regressions in Table (3) showed that it did not significantly affect the way housing prices changed. This conflicts with the results that I gained from my summary statistics in Tables (1) and (2), and with Hypotheses (5) and (6). I believe it is due to the

qualitative nature that comes along with trying to determine the effects of bank regulations and deregulations. Papers such as McCoy (2008) definitively point at the deregulations of the late 1990's for having a hand in creating the housing bubble of the mid-2000's. Using this conclusion, we know that the shadow banking sector was at least somewhat responsible for the risky behavior and the inflation of home purchase prices. The fact that this did not become evident in my study shows that my sample and my method of measurement may not have been sufficient in trying to examine the effects of bank regulation on the housing market.

## **5. CONCLUSIONS**

The key goal of my research was to find how the stock and housing markets reacted in the face of changing bank regulations. To answer this, I had to choose specific criteria banks are subject to – such as capital and disclosure requirements, risk calculations, lending practices, etc. – and select a sample of regulations that targeted such policies. Because these can be difficult to quantify and often overlap one another, the dummy variable that I applied to my sample provides me with a cumulative look at what is going on in times of ongoing change in policy. My findings indicate that the economy is currently at a level where imposing harsher bank regulations will cause stock markets to rise, which means that deregulating at this time would not only hurt markets but also consumers. Outside of the research I have already conducted, determining the differences between home purchase and rental prices would provide valuable insight into how the bank regulations contributed to this sector of the economy. Additionally, focusing the sample of regulations that I have and running regressions on smaller time periods would also be helpful in telling how the changing regulations act on the various markets I researched. Lastly, I would like to see how the size of affected banks contributes to the effect these regulations have.

In light of my findings, it is important to remember that the banks which these restrictions are meant to control are the systemically-important ones with the most stakeholders. Small banks that are typically underserved can suffer and fail because of the restrictions written with the large banks in mind. Ultimately, the content and scope of the regulations imposed are what count the most. They must only be present enough to act as a safety net, because any further holds will choke economic progress and likely create another shadow banking sector.

## **ENDNOTES**

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## APPENDIX

### EXAMPLES OF REGULATIONS AND DEREGULATIONS

The sample of regulations and deregulations from 1995-2017 were taken from the Federal Reserve's list of press releases. They were picked based on if/how they affected the way banks treat consumers, how banks' leverage and capital ratios changed, how they calculated risk, how they represented their assets, etc.

	Year	Provision	Periods	Related To:
Regulations	<u>1995</u>	Banks have to create "performance-based & objective standard" for banks in lower income areas; more focus on record-keeping; new evaluations of loans & investments made to test compliance with CRA	May 4th, 1995-September 2005	Community Reinvestment Act
	<u>2004</u>	<b>June Proposal</b> for new approaches of "varying sophistication" for calculating operational risk, and new Standardized & Internal approach for market risk; gave regulators better tools; established disclosure requirements	January 2007-January 2014	Basel II
Deregulations	<u>1997</u>	Banks can extend credit to its executive officers under some provisions, effective <b>April 1st</b>	April 1st, 1997-October 13th, 2006	Regulation O
	<u>1997</u>	Removal of risk floor used in calculating market risk, effective <b>January 1st, 1998</b>	January 1st, 1998-November 1st, 2007	Basel Capital Accords

The sample period is from 1995 to 2017. The sample includes 29 regulation and 21 deregulation periods. The difference in means test uses the unequal variance t-test. The significance level of the difference in medians is based on a Wilcoxon rank-sum two sample test. The symbols \*\*\*, \*\* and \* indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.

**Table 1: Descriptive statistics**

Variable	Regulation Periods			Deregulation Periods			Difference	
	N	Mean	Median	N	Mean	Median	Mean	Median
Housing Price	29	145.38	143.35	21	138.17	133.78	7.21*	9.57**
Stock Market Volatility (VIX)	29	17.70	17.85	21	19.65	20.74	-1.95***	-2.89***
S&P 500 Index	29	1,711.15	1,643.94	21	1,497.01	1,345.24	214.14**	298.70***
CPI Index	29	228.13	231.50	21	209.74	204.20	18.40***	27.30***
3-Month T-Bill (%)	29	0.58	0.15	21	1.58	1.72	-1.00***	-1.57***
30-Year Mortgage Rate (%)	29	4.32	4.05	21	5.26	5.53	-0.94***	-1.48***
Federal Funds Rate (%)	29	0.69	0.23	21	1.83	2.06	-1.14***	-1.83***

The sample period is from 1995 to 2017. The sample includes 29 regulation and 21 deregulation periods. The difference in means test uses the unequal variance t-test. The significance level of the difference in medians is based on a Wilcoxon rank-sum two sample test. The symbols \*\*\*, \*\* and \* indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.

**Table 2: The impact of banking regulations and deregulations on the stock and housing markets**

Variable	Regulation Periods			Deregulation Periods			Difference	
	N	Mean	Median	N	Mean	Median	Mean	Median
Δ Housing Price	29	28.42%	27.01%	21	59.74%	62.38%	-31.32%**	-35.37%**
Δ Stock Market Volatility (VIX)	29	-18.65%	-19.63%	21	-7.07%	-14.86%	-11.58%	-4.78%
Δ S&P 500 Index	29	81.48%	76.65%	21	83.75%	76.98%	-2.27%	-0.33%
Δ GDP	29	15.00%	13.19%	21	29.05%	28.96%	-14.05%***	-15.77%***
Inflation (Δ CPI Index)	29	12.91%	10.94%	21	29.20%	28.42%	-16.30%***	-17.49%***

The sample period is from 1995 to 2017. The sample includes 29 regulation and 21 deregulation periods. The symbols \*\*\*, \*\* and \* indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.

**Table 3: Regressions explaining the impact of banking regulations on the stock market returns and housing prices**

Dependent Variable:	Stock Return			Δ Housing Price		
Dummy=1 if regulation	0.46***	0.29**	0.25**	-0.04	-0.06	-0.05
S.E.	(0.13)	(0.11)	(0.11)	(0.04)	(0.04)	(0.04)
Stock Market Volatility (VIX)	-0.02	0.04	0.06**			
S.E.	(0.03)	(0.03)	(0.03)			
Δ GDP	4.33***	6.54***	6.50***	3.27***	3.49***	3.40***
S.E.	(0.92)	(0.87)	(0.85)	(0.29)	(0.29)	(0.29)
Inflation (Δ CPI Index)	-0.27	-1.63*	-1.75*	-1.66***	-1.79***	-1.72***
S.E.	(1.05)	(0.90)	(0.89)	(0.28)	(0.29)	(0.28)
3-Month T-Bill (%)		-0.36***		0.08***		
S.E.		(0.07)		(0.02)		
30-Year Mortgage Rate (%)					0.05*	
S.E.					(0.03)	
Federal Funds Rate (%)			-0.37***			0.06***
S.E.			(0.07)			(0.02)
Intercept	0.03	-0.67	-0.99**	0.01	-0.18	0.00
S.E.	(0.55)	(0.47)	(0.48)	(0.04)	(0.13)	(0.04)
R-square	0.77	0.85	0.86	0.94	0.93	0.93
# of Observations	50	50	50	50	50	50

## **The Effect of Recruitment Intermediary's Informal Status on Negotiating Recruitment Incentives for Migrant Workers**

**Bilesha Weeraratne\***

### **ABSTRACT**

This paper examines the causal effect of migrants' perception of the recruitment intermediary's formal status and their power dynamics on the amount of recruitment incentives and wages negotiated. The study adopts a propensity score matching technique on a sample of current and potential migrants from Sri Lanka to the Gulf Cooperation Countries. The study finds casual relationships between perceived formal status of Sub Agents, and promised incentives and wages, some evidence of over promising and under delivery of recruitment incentives by Sub Agents, and about the importance of the power balance between agents and sub-agents.

### **INTRODUCTION**

Recruitment for foreign employment involves formal agents, as well as informal recruitment intermediaries. Often these informal recruitment intermediaries possess more power in the recruitment process than formal agents, while their informal status allows them to evade all regulations and responsibilities. As such, many labor sending countries, including Sri Lanka, are grappling with the issue of regulating informal recruitment intermediaries to improve the recruitment process of migrant workers. In recent years a series of conscious effort were taken by the regulators in Sri Lanka to regulate sub-agents. The absence of an empirical evidence base may have contributed to the failure of these previous efforts.

In this context, this paper aims to understand the dynamics between the recruitment intermediary and potential migrant in the context of the latter's perceived knowledge about the formal/informal status of former. As such, the study aims to answer 3 research questions; (1) Does the migrant's perception of the recruitment intermediary's formal status affect her negotiation of upfront recruitment incentives?; (2) Does the migrant's perception of recruitment intermediary's formal status affect the amount of up front incentives actually received?; and (3) Does the migrant's perception of recruitment intermediary's formal status affect her negotiation of salaries? This study answers these research questions using a primary data collected in 2017 of Sri Lankan females pursuing domestic worker jobs in the Gulf Cooperation Council (GCC) countries using propensity score matching models.

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The remainder of this article is organized as follows. Section 2 provides a background of labor migration from Sri Lanka with emphasis on the recruitment process, followed by a discussion of existing literature dealing with the involvement of recruitment intermediaries, in Section 3. A presentation of descriptive statistics of data is in Section 4. Section 5 introduces the propensity score matching methodology and the choice of variables used in the matching equations and as outcomes. Estimation results and related discussion on their policy implications for ongoing regulatory effort is presented in Section 6. The article is concluded in Section 7 with a summary of findings and recommendations.

## **BACKGROUND**

Temporary Labor migration is an important component of the Sri Lankan economy. Each year over of a quarter million Sri Lankans leave for foreign employment. In 2016, there were 242,930 departures for foreign employment. Majority of these worker's head to the Gulf Cooperation Council (GCC) region, to perform low skilled jobs. In 2016, of total migrants 88 percent were to the GCC, while 57 percent of total departures consisted of low skilled workers, which including 27 percent Female Domestic Workers (FDW). Recruitment for temporary migrant workers in Sri Lanka is either through the formal recruitment channels involving licensed agents, or through personal networks. In recent years nearly half of all migrants were recruited through licensed agents.

Recruitment for FDW jobs in the GCC countries has evolved into a unique set up in Sri Lanka, where the entire recruitment cost and a recruitment incentive are paid upfront by the employer in the host country. As noted by Weeraratne *et al.* (forthcoming) an employer spends approximately USD 4,000-5,500 to hire a FDW from Sri Lanka and the upfront incentive received is approximately USD 1,500. Normally the upfront payments by the employer at destination country are paid to the recruitment agent at destination, who remits the money to the recruitment agent in Sri Lanka subsequent to retaining his commission. In Sri Lanka, the recruitment agent, who receives this money, selects a potential migrant and prepares her for recruitment. In 2016, there were 1,011 licensed recruitment agents in Sri Lanka. However, the Parliamentary Act (the Sri Lanka Bureau of Foreign Employment Act No. 21 of 1985 amended by the Act No. 04 of 1994 and Act No. 56 of 2009) which governs these recruitment agents do not facilitate them to establish branches. Given that most recruitment agents are situated in cities and potential migrants are located in villages, there is a gap in licensed recruitment agents' capacity to reach grassroots at the villages. To address this gap, an intermediary layer of informal sub-agents have evolved over the year, who visit villages and scout potential migrants. Unsubstantiated estimates reported in HRW (2007, pp.25) indicate that there were 10,000-20,000 sub-agents in Sri Lanka in 2007 and that '75 to 80 percent of maids are channeling through Sub-Agents'.

As discussed later in Section 4 on Descriptive statistics, despite their informal status, most potential migrants are under the impression that sub-agents are formal representatives of the licensed recruitment

agents and are officially recognized by SLBFE. This misconception by the part of potential and current migrants leads to greater power for sub-agents in the recruitment process. As such, often it is a sub-agent who finds a suitable candidate for a licensed recruitment agent's job order. In addition to scouting, sub-agents also assist potential migrants navigate the migration process for FDWs, which involves amassing credentials, fulfilling training requirement and registering with the SLBFE. For all these services, the sub-agent charges a commission, which comes out of the upfront incentive provided by the employer at destination. Weeraratne *et al.* (forthcoming) notes that licensed agent and sub-agent catering to Saudi Arabia receive approximately USD 670 and USD 330, respectively, for their services in the recruitment process.

In many cases, the Sub-Agent is a known person from the potential migrant's village. This 'one of us' attitude that potential migrants have towards sub-agents, migrants related ease in placing trust on the sub-agent, and the guidance provided by sub-agents encourage potential migrants to comfortably approach an unknown licensed agent for foreign employment. Nonetheless, due to this informal nature of the sub-agents role in the migration process, it is well documented that misleading and deception of potential migrants is rampant among sub-agents (Caritas, n.d.; Gunasinghe, 2013a; HRW, 2007; ILO, 2013; Ukwatte, 2012; Weeraratne, 2014). Similarly, sub-agents enjoy an unreasonable amount of power in the recruitment process and demands large commissions and upfront cash advances from licensed agents by threatening to re-direct a previously agreed and groomed potential FDW to a competing agent. Similarly, their power on potential migrants is exerted by retaining valuable information about the employment opportunity abroad.

Despite being informal, this powerful role played by sub-agents has made them an integral stakeholder of the migration industry. The only effort to regulate sub-agents was the issuance of identification cards through the respective licensed agents in 2011. The identification cards were issued by the Sri Lanka Bureau of Foreign Employment (SLBFE). Presently, it is deemed that this effort to regulate these informal sub-agents was unsuccessful as only a few persons voluntarily claimed their status as Sub-Agents, and as a result there were more sub-agents operating in the field than registered Sub- Agents and unethical and unregulated activities continue. As such, on March 10, 2016 the SLBFE issued a circular requesting all licensed agents to return the identification cards issued to their respective sub-agents by March 28, 2016. This circular implies the government position of not recognizing the operation of sub-agents. Subsequently, March 2017, a Cabinet Paper (No: 03/2017; Reference No: MFE/DEV/6/7 (i)) was issues to regularize intermediaries in the recruitment industry for foreign employment

## LITERATURE REVIEW

The issues related to recruitment intermediaries are encountered in many sending countries in Asia. ILO (2014) notes that informal sub-agents are referred to as “Dalals” or intermediaries in Bangladesh, and they mostly operate outside capital cities. This thriving industry for intermediaries in recruitment for foreign employment includes both unregistered small enterprises and individual sub-agents. ILO (2014, pp.46) reports that similar to the case in Sri Lanka, in Bangladesh also ‘informally, individuals act as sub agents for labor-brokerage agencies, going village to village to recruit candidates’ ILO (2014). In addition to recruitment intermediaries within Nepal, it is reported that an estimated that 17-34 million USD is annually transferred through informal channels from Nepal as illegal commissions to middlemen and recruitment agencies in Qatar (Endo & Afram, 2011).

In India, Sasikumar & Timothy (2015) highlight that the Emigration Act prohibits the deployment of sub agents or commission agents within the migration system. Still, the involvement of intermediaries is wide spread to connect a prospective migrant to a registered recruiting agent. These sub agents in India ‘work at the village level, searching for potential migrants; sometimes they target households and lure workers into migrating, citing the possibility of improving their economic position or obtaining a better job with a specific qualification’ (Sasikumar & Timothy, 2015, pp.29).

Similar to other countries in the South Asian region, in Sri Lanka also the services of Sub Agents are crucial in the recruitment process. HRW (2007, pp.95) notes that ‘Sri Lanka’s labor recruitment industry requires more stringent monitoring and regulation’ to avoid regulatory gaps related and enhance regulation and monitoring of Sub Agents. HRW (2007) also highlights that licensed agencies hire and delegate duties to Sub Agents, but the former bear no responsibility for the illegal actions of the latter. Hinting the possibility of the recently proposed actions of the Cabinet Paper of 2017/03, HRW (2007, pp.96) notes that ‘licensing and regulation system by which licensed agents register their Sub Agents is possible to implement’ because licensed agencies frequently work with a consistent roster of Sub Agents and pay them commissions. The same report also notes the view of some stakeholders that regulating Sub Agents will create more problems as despite being key players in the recruitment process, they are acting in ad hoc ways and their activities are limited to a single agent.

Caritas (n.d., pp.42) depicts the manner in which agents and migrants in Sri Lanka rely on Sub Agents, and notes that agents rely on Sub Agents ‘to announce job availability by word-of-mouth in the community/villages and to convince women to migrate by assuring them all the assistance and services during the entire migration process’. This publication also states that often Sub Agents are from the same community as potential migrants, which makes the interaction of the two groups hassle free, and potential migrants are often convinced that they are ‘actually going through legal channels. Very often, the sub agents are the only contact to migrants throughout the entire migration process.’

The ILO (2013, pp.24) report notes that 'irrespective of decentralisation policies of [Sri Lanka Bureau of Foreign Employment] SLBFEs services and establishing of recruitment agencies island wide, exploitations of prospective migrant worker in the hands of Sub Agents appear to be still a concern factor prevailing in the recruitment system which has not been successfully managed by the authorities yet'. These authors also note that 'the Philippines recruitment mechanism is also enriched with some concern on the sub-agent factor', and indicates how Sri Lanka can learn from their experience in regulating Sub Agents (ILO, 2013, pp.33).

Gunasinghe (2013b, pp.21) note the Sri Lankan government's 'intention to change existing legislation to include compulsory registration and regulation of sub agents'. The authors also underscore that there was no consultative process or transparency in amending these laws. However, as noted by Timothy *et al.* (2016, pp.29), these intentions were not yet materialized. For example, in reviewing the institutional framework for labour migration, Timothy *et al.* (2016, pp.29) state that 'the present SLBFE Act does not adequately cover the role and responsibility of sub-agents who are involved in the migration' and mentions about the proposed Act aims to recognize sub-agents by introducing legally binding provisions with recruitment agents to promote ethical recruitment practices.

As seen in the above literature review on Sub Agents in Sri Lanka, there has been interest by the government to regulate Sub Agents for a considerable amount of time, and the recent Cabinet Paper of /03/2017 is a culmination of all these efforts. However, previous literature has rarely focused on the possible implications of such regulations. In this context, the current paper addresses an important gap in literature concerning Sub Agents.

## **DATA AND DESCRIPTIVE STATISTICS**

The study is based on primary data collected in three purposively selected high migration districts in Sri Lanka. The districts were Gampaha, Kurunegala and Puttalam, and data was collected in April to July 2017. The sample covered a total of 503 households consisting of 280 households with potential migrants and 223 households with current migrants. The survey was limited to females, who have or are pursuing domestic work in one of the six GCC countries, through a Sub-Agent.

Of the entire sample 141 were from Gampaha, 205 from Kurunegala and 157 from Puttalam district. The average age of migrants in the sample (unless specified otherwise, migrants in the sample refer to both current and potential migrants) was 38.7 years and 41 % have educated up to 6th to 10th Grade and another 39 % had passed the General Certificate in Education Ordinary Level (GCE O/L) examination, while 79 % of migrants were married.

The survey reveals that 35% of migrants' found their Sub-Agents were from the same village, while approximately 14 % of migrants were contacted by the Sub-Agent. Despite the fact that migrants in the sample were all females, 72 % of the Sub-Agents were males, and most (51 %) were in the age group of

40-50 years. To 57 % of migrants in the sample the upfront incentive was promised by the licensed recruitment agent, while sub-agent had promised for 34 %. The average amount promised as upfront incentives by either agent or Sub- Agent for 483 migrants was 154,517 LKR. The average amount promised for current migrants was 168,790 LKR (for 214 current migrants), while the average amount paid (for the 221 current migrants) was 123,618 LKR. This difference between the promised and actual paid amount indicates over promising and under delivering by agents and Sub-Agents in the recruitment process.

The disbursement of incentives were reported to be equally handled by agents and Sub-Agents (44 % each), while 12 % indicated that they were paid by both licensed Agents and Sub-Agents. In terms of receiving incentives, 57% of current migrants had accepted the incentives themselves, while 24 % reported to have accepted by husband.

In the sample 63 % of respondents perceive Sub-Agents to have more power in recruitment process and 56 % participants said that the Sub-Agents decide the amount of incentives paid to migrants. Similarly, majority of the respondents (55 %) reported that Sub-Agents have more power to decide the amount of incentives paid for Sub-Agents.

Majority of the participants responded that Sub-Agents are not compulsory in recruitment process. Nonetheless, underscoring the degree of misconception of Sub-Agents' formal status, 46 % of respondents were of the perception that Sub-Agents are official representatives of licensed agents, and only 16 % were of the view that they were not official representatives. Similarly, 37 % of respondents had the misconception that Sub-Agents are officially recognized by the SLBFE. Interestingly, 46 % of the respondents did not know if Sub-Agents were officially recognized by the SLBFE, while 38 % did not know if Sub-Agents were official representatives the licensed agents. More interestingly, of the 503 migrants 145 or 29 % have reported that their Sub-Agent showed an official identification card.

## **METHODOLOGY**

The study adopts a propensity score matching (PSM) technique, developed by Rosen-baum & Rubin (1983), to match migrants across their perception of recruitment intermediaries' informal status, using survey data collected in 2017 from a sample of 503 current and potential migrants from Sri Lanka to the GCC. The treatment considered here is respondents' perceptions about Sub-Agents' formal status. If a migrant perceives a sub-agent as formal, such migrants are considered to be in the treatment group, while others in the control group. The analysis is based on three such treatment variables, namely migrant's perception if Sub-Agent is an official representative of licensed agent, migrant's perception if Sub-Agent is officially recognized by the migration regulatory bodies in Sri Lanka, and if Sub Agent showed an identification card related to his involvement in the recruitment process.

**Table 1: Summary Statistics**

<b>Variable</b>	<b>%</b>	<b>Variable</b>	<b>%</b>	<b>Variable</b>	<b>%</b>
SA Area		Incentives		Decisions on incentives	
- Same village	35	-Promised by LA	57	-LA	28
- Neighboring village	44	-Promised by SA	34	-SA	55
-Other	21	-None of the above	9	-Don't know	17
SA introduced by		Disbursement of Incentives		Involving SA Compulsory	
-Family / relatives	48	-LA	44	-Yes	33
-Contact by SA	14	-SA	44	-No	45
- Agent/Agency	5	-Both	12	-Don't know	22
-Other	33	Recipient of Incentives		SA official rep. of LA	
Gender of SA		-Current Migrant	57	-Yes	46
-Male	72	-Husband	24	-No	16
-Female	28	-Parents	7	-Don't know	38
Age of SA		-other	12	SA recognized by SLBFE	
-40-50	51	Power In recruitment		-Yes	38
-30-40	22	-LA	20	-No	16
-50-60	20	-Sub Agents	63	-Don't Know	46
-Other	7	-Don't know	17		
<b>Variable</b>		<b>N</b>	<b>Av. (LKR)</b>	<b>SD</b>	
Incentives Promised					
- current + potential		483	154,517	85,125	
- current migrant		214	168,790	87,539	
Incentives Received by current migrants		221	123,618	88,329	

SA=Sub Agent, LA= Licensed Agent

Additionally, the study also investigates the impact of the migrants' perception of power dynamics between the agent and the Sub-Agent in the recruitment process, by considering those who perceive the Sub-Agent to have more power as the control group and others the treatment group.

The PSM technique estimates the potential outcome for each migrant if she was assigned to the other group, based on an average of the outcomes of similar migrants that were in control group. Estimated treatment probabilities (propensity scores) ensures similarity between subjects. This matching methodology is appropriate when those do and do not receive the treatment can be matched on observable characteristics. The matching equation in each analysis uses a vector of migrant's characteristics which include age and indicator variables for current/potential migrant status, country of destination, education level of migrant, previously employed or not in Sri Lanka and for first time migrant workers, as well as the gender of the Sub-Agent.

The outcome variables considered in the models are promised amount of recruitment incentives, received amount of recruitment incentives, amount of wages negotiated. All amounts reported in data are in Sri Lankan Rupees. As seen in Table 3, the models for promised amount of upfront incentives, and promise wages are estimates for both current and potential migrants, while the models for incentives received are estimated only for current migrants.

## RESULTS AND DISCUSSION

As seen in row one in Table 3, the perception of migrants about Sub-Agent being a formal representative of the licensed agent does not have an impact on the amount of upfront incentives promised to the migrant, amount of upfront incentives received and wages negotiated. Specifically, the first recommendation of the Cabinet Paper 03/2017 is to 'grant permission to the licensed Foreign Employments Agents to appoint sub agents for the purpose of promoting business of the said agency with the approval of the regulatory authority, SLBFE subject to prescribe process'. As shown in the findings related to *sub agent official rep.* the first recommendation would not have a causal effect on incentives promised or received nor on wages negotiated.

The third recommendation of the same Cabinet Paper is for the SLBFE to decide, monitor and regulate the functions of the sub agent/intermediary. As seen in the results related to *sub agent officially recognized* this policy change would also not have any causal effect on incentives promised or received, nor on wages negotiated.

**Table 3:** PSM Estimates of impact of perception of Sub-Agent's formal status on various outcomes

Outcomes	Incentive promised		Incentive received		Wages	
	ATE	ATET	ATE	ATET	ATE	ATET
sub agent official rep. yes vs no N	3,913.0 (12095.1) 299	11,918.2 (13575.6) 299	4,462.0 (11827.6) 158	5,045.8 (13400.2) 158	1,240.4 (1434.0) 312	1,149.4 (1667.1) 312
sub agent officially recognized yes vs no N	-210.7 (12853.9) 261	14,388.9 (13148.6) 261	-1,659.9 (5783.8) 147	-1,232.8 (6111.4) 147	748.2 (1071.2) 272	968.3 (1211.0) 272
showed ID (Yes vs No) N	31,109.2** (12572.9) 284	22,158.7* (12153.1) 284	-3,232.6 (4864.8)	-6,903.4 (5355.7)	1,518.7 (1463.8) 294	-653.8 (1598.3) 294

Standard errors in parentheses \* p<0.10 \*\* p<0.05 \*\*\* p<0.01

The fourth recommendation of the Cabinet Paper 03/2017 is for all Sub-Agents to be registered and to be issued with a valid license from SLBFE. As seen in the last row in Table 3, the Average Treatment Effect

(ATE) of those who saw identification is an increase in incentives promised by 31,109.2 LKR. Nonetheless, as shown in the subsequent columns there is no causal impact on the actual incentives paid or wages negotiated. The corresponding Average Treatment on the Treated (ATET) is 22,158.7 LKR. As in the case of previous treatment variables considered, here also there were no statistical significance in the case of the remaining two outcomes of incentives received and wages negotiated. This indicates that implementing the recommendation number 4 in the cabinet paper has the potential to increase the discrepancy between the promised and paid out recruitment incentives, possibly due to the greater power that the Sub-Agents might acquire with the possession of an identification/license document.

In addition to testing the causal effect of migrants' perception on Sub-Agent's formal status, the analysis also focuses on migrants' perception of the Sub-Agent's power in the recruitment process. Table 4 depicts the causal impact of migrants' perception of power dynamics between agent and Sub-Agent in negotiating upfront incentives and wages. As seen in the first row of Table 4, the ATE of perceiving Sub-Agent has more power in the recruitment process is an increase in the amount of incentives promised by 19,337.5 LKR. The corresponding ATET, is a larger increase of LKR 22,365.70 LKR. As before, similar causal effect is not evident in the case of actual incentives received. This hints that those who perceived Sub-Agent to be more powerful in the recruitment process on average negotiated higher upfront incentives. Nonetheless, the absence of a related increase in actual upfront incentives received, once again reflects the potential to increase the discrepancy between the promised and paid out recruitment incentives.

In addition to incentives promised, those who perceived that Sub-Agent has more power in recruitment process has a higher ATE on wages. This statistically significant causal effect is 1,673.9 LKR. Similarly, migrants' perception on who decides the amount of up front incentives promised to the migrant also has a causal impact on the amount of incentives promised.

**Table 4:** PSM Estimates of impact of perception of Sub-Agent's power on various outcomes

	Incentive promised		Incentive received		Wages	
	ATE	ATET	ATE	ATET	ATE	ATET
More power in recruitment process	19,337.5***	22,365.7***	-4,497.6	-3,358.5	1,673.9*	1,477.9
SA vs A	(5373.4)	(6075.1)	(6323.4)	(7151.2)	(965.7)	(967.5)
N	403	403	225	225	417	417
Decision maker on incentives	23,333.7***	25,989.1***	-7,265.1	-6,096.0	1,883.6**	2,014.3***
SA vs A	(8166.3)	(8503.6)	(4434.4)	(5114.0)	(790.7)	(774.4)
N	409	409	232	232	421	421

Standard errors in parentheses \* p<0.10 \*\* p<0.05 \*\*\* p<0.01

As seen in Table 4, those who believed that Sub-Agent has the decision making power in the amount of remittances has ATE of 23,333.70 LKR and ATET of 25,989.10 LKR. Once again, when the actual incentive

received are considered, the associated results are not statistically significant. As before, for the amount of wages the causal effect of perceiving Sub-Agent decides the amount of incentives is statistically significant and is 1,883.60 LKR, while the corresponding ATET is 2,014.30 LKR.

The findings of above models indicate that migrants' perception of Sub-Agent's formal status would only affect the promised amount of upfront incentives and would not affect the actual incentives or wages received. However, migrants' perception of who has more power in the recruitment process impacts wages in addition to promised incentives. As such, in regulating Sub-Agents it is important to understand the balance of power between agents and Sub-Agents as well as the perception of same held by migrants.

This indicates that any change to recruitment intermediaries' informal status, that would come about as a result of ongoing policy formulation would not affect migrant workers' bargaining power in terms of negotiating recruitment incentives or wages.

## **SUMMARY**

This study adopts a propensity score matching methodology to evaluate the causal effect of migrant's perception of Sub-Agents on the determination of the amount of recruitment incentives promised and paid, as well as wages earned. The study finds casual relationships between perceived formal status of Sub Agents and promised incentives and wages, some evidence of over promising and under delivery of recruitment incentives by Sub Agents, and that more than perception about Sub-Agents' formal status, greater implications are due to perception about the power balance between agents and sub-agents. As such, in recommending policy recommendations, it is important to understand the significance of the power distribution of the recruitment process between agents and Sub-Agents, and communication of same to migrants. To this effect future policy formulation ought to also incorporate activities to improve awareness of current and potential migrants about formal status of Sub-Agents.

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## Relationship between Two Sample and One Sample Confidence Intervals

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### ABSTRACT

In practice, when comparing the mean of two independent samples (say  $\mu_1$  and  $\mu_2$ ), practitioners sometimes just look at the individual confidence intervals (say  $I_1$  and  $I_2$ ), and claim that their mean difference ( $\mu_1 - \mu_2$ ) is significantly different from 0 (WOLOG) if the two individual confidence intervals corresponding to each mean does not overlap and non-significant if they overlap. In this short note, we are going to show formally that when  $I_1$  and  $I_2$  are disjoint, then it is generally true that  $(\mu_1 - \mu_2)$  will be significantly different from 0, but this does not hold the other way around.

### INTRODUCTION

Sampling groups is an important statistical method in data analysis, which is widely used in many research fields, including applied economics. In this paper, we are going to theoretically study the relationship between confidence intervals overlap and their mean difference significantly different from 0. Some of previous case by case results can be seen from (Cumming, 2009), (Schenker and Gentleman, 2001) and (Mulekar and Mishra, 2000).

For simplicity, let's start from the setup where asymptotic normality results are used. We assume that readers understand the relationship between two-sided hypothesis testing problems and two-sided confidence intervals, for example, (Hogg. etc. 2005, p. 236). Suppose  $I_i(\alpha)$  is the two-sided 'symmetric'  $100 \times (1 - \alpha)\%$  confidence interval for  $\mu_i$  using standard normal critical values, that is

$$I_i(\alpha) = \bar{X}_i \pm z_{1-\alpha/2} \frac{\sigma_i}{\sqrt{n_i}}, \quad i = 1, 2. \quad (1)$$

When  $I_1(\alpha)$  and  $I_2(\alpha)$  are disjoint, then without loss of generality, let  $SD$  represent the standard deviation and let's assume that the lower bound of  $I_1(\alpha)$  is larger than the upper bound of  $I_2(\alpha)$ , that is,

$$\bar{X}_1 - z_{1-\alpha/2} \frac{\sigma_1}{\sqrt{n_1}} > \bar{X}_2 + z_{1-\alpha/2} \frac{\sigma_2}{\sqrt{n_2}}, \text{ which can be written as}$$

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$$\frac{\bar{X}_1 - \bar{X}_2}{SD(\bar{X}_1 - \bar{X}_2)} > \kappa z_{1-\alpha/2}, \quad (2)$$

where,

$$\kappa = \frac{\sigma_1 / \sqrt{n_1} + \sigma_2 / \sqrt{n_2}}{SD(\bar{X}_1 - \bar{X}_2)}. \quad (3)$$

## DISCUSSION

If  $\sigma_1, \sigma_2$  are both known, then  $SD(\bar{X}_1 - \bar{X}_2) = \sqrt{\sigma_1^2 / n_1 + \sigma_2^2 / n_2}$ . It is well-known that the following inequality is true, for any  $a, b \geq 0$ ,

$$1 \leq \frac{a+b}{\sqrt{a^2+b^2}} \leq \sqrt{2}. \quad (4)$$

Thus,  $1 \leq \kappa \leq \sqrt{2}$  and inequality (2) implies that

$$0 < \bar{X}_1 - \bar{X}_2 - z_{1-\alpha/2} SD(\bar{X}_1 - \bar{X}_2), \quad (5)$$

that is, 0 is less than the lower bound of the  $100 \times (1 - \alpha)\%$  confidence interval of  $(\mu_1 - \mu_2)$ . Therefore, indeed  $\mu_1$  and  $\mu_2$  are significantly different.

When  $\sigma_1$  and  $\sigma_2$  are unknown, the sample variances are often used to estimate the variance. Denote the corresponding standard errors (square root of sample variance) as  $s_1$  and  $s_2$  respectively. Then two-sample  $t$ -test will be used to compare the means of the two independent samples. Assuming same variances, the standard error of the sample mean difference  $(\bar{X}_1 - \bar{X}_2)$  will be

$$SE(\bar{X}_1 - \bar{X}_2) = \sqrt{\frac{1}{n_1} + \frac{1}{n_2}} \sqrt{\frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1 + n_2 - 2}}. \quad (6)$$

Similar to the above discussion, we will have

$$\frac{\bar{X}_1 - \bar{X}_2}{SE(\bar{X}_1 - \bar{X}_2)} \geq \tilde{\kappa} t_{n_1+n_2-2, 1-\alpha/2}, \quad (7)$$

where

$$\tilde{\kappa} = \frac{t_{n_1-1, 1-\alpha/2} \frac{s_1}{\sqrt{n_1}} + t_{n_2-1, 1-\alpha/2} \frac{s_2}{\sqrt{n_2}}}{t_{n_1+n_2-2, 1-\alpha/2} SE(\bar{X}_1 - \bar{X}_2)}. \quad (8)$$

Note that the  $(1-\alpha/2)$ -th  $t$ -quantile is a decreasing function of degrees of freedom, thus,  $t_{n_1+n_2-2,1-\alpha/2} \leq \min(t_{n_1-1,1-\alpha/2}, t_{n_2-1,1-\alpha/2})$ . Thus,

$$\tilde{\kappa} = \frac{\frac{s_1}{\sqrt{n_1}} + \frac{s_2}{\sqrt{n_2}}}{SE(\bar{X}_1 - \bar{X}_2)}. \quad (9)$$

Clearly, when the sample sizes are the same, i.e.  $n_1 = n_2$ , , from (9), we have  $\tilde{\kappa} \geq 1$ . When  $n_1$  and  $n_2$  are not equal, there is a possibility that  $\tilde{\kappa}$  will be less than 1. To see this, let's re-parameterize  $\tilde{\kappa}$  in (8) in terms of  $n_1, n_2$  and  $\lambda = s_1 / s_2$ .

$$\tilde{\kappa} = \frac{t_{n_1-1,1-\alpha/2} \frac{\lambda}{\sqrt{n_1}} + t_{n_2-1,1-\alpha/2} \frac{\lambda}{\sqrt{n_2}}}{t_{n_1+n_2-2,1-\alpha/2} \sqrt{\frac{1}{n_1} + \frac{1}{n_2}} \sqrt{\frac{(n_1-1)\lambda^2 + (n_2-1)}{n_1+n_2-2}}}. \quad (10)$$

On the other hand, recall that we use the standard error formula in (6) only when we believe that the variances of the two groups are equal. In practice, we would like to do a  $F$ -test to test equal variances of the two groups before using the formula in (6). Specifically, the test statistic for testing equal variances is

$$F = \frac{s_1^2}{s_2^2}, \quad (11)$$

which follows a  $F_{n_1-1, n_2-1}$  distribution under the null hypothesis (equal variance) and will reject the null hypothesis for either too small or too large  $F$  values. In other words, we will use the standard error in (6) only when

$$\lambda^2 \in [F_{n_1-1, n_2-1, \alpha/2}, F_{n_1-1, n_2-1, 1-\alpha/2}]. \quad (12)$$

It can be seen that when  $n_1$  is fixed, and  $n_2 \rightarrow \infty$ , then  $F_{n_1-1, n_2-1}$  distribution will converge to  $\chi_{n_1-1}^2 / (n_1 - 1)$ , whose median is roughly  $(1 - 2 / (9(n_1 - 1)))^3$ . On the other hand, it can be seen that  $\tilde{\kappa}$  will be close to  $t_{n_1-1,1-\alpha/2} \lambda / t_{n_1+n_2-2,1-\alpha/2}$  which can be less than 1, for some  $\lambda$  within 95% confidence interval of the corresponding  $F$  -distribution. Table 1 gives the  $n_1, n_2, \lambda$  value such that  $\tilde{\kappa}$  happens to hit the numerical value less than 1. All numerical calculations, unless pointed out explicitly, will be performed using  $\alpha = 0.05$ .

Table 1: Sample size and  $\tilde{\kappa}$  (<0.9) value using (10) when the F-test fails to reject equal variance assumption.

$n_1$	$n_2$	$\lambda$	$\tilde{\kappa}$
2	5	0.033	0.801086
3	9	0.159	0.873758
4	15	0.265	0.898141
5	25	0.343	0.893694
6	37	0.402	0.896686
7	52	0.448	0.898099
8	70	0.486	0.899217
9	92	0.517	0.898948
10	117	0.543	0.899479
11	146	0.565	0.899657
12	179	0.585	0.899803
13	217	0.602	0.899556
14	258	0.617	0.899997
15	305	0.631	0.899904
16	357	0.643	0.899855
17	414	0.654	0.899890
18	477	0.664	0.899844
19	545	0.674	0.899946
20	620	0.682	0.899916

When both  $n_1$  and  $n_2$  go to infinity, regardless of the converging orders of them, it can be seen that  $\lambda$  has to be 1 as the  $F$ -distribution will converge to a discrete distribution with probability 1 at 1, if we insist using the formula in (6). In this case, one would still have  $\tilde{\kappa} \geq 1$ .

When we do not believe that the equal variance assumption holds, then we need to use the following estimator of standard error of  $\bar{X}_1 - \bar{X}_2$ ,

$$SE(\bar{X}_1 - \bar{X}_2) = \sqrt{s_1^2/n_1 + s_2^2/n_2} \quad (13)$$

where its corresponding degrees of freedom now is approximated by the Welch-Satterthwaite equation,

$$d = \frac{(s_1^2/n_1 + s_2^2/n_2)^2}{(s_1^2/n_1)^2/(n_1-1) + (s_2^2/n_2)^2/(n_2-1)} \quad (14)$$

In this case, again we write  $\tilde{\kappa}$  in forms of  $\lambda$ ,

$$\tilde{\kappa} = \frac{t_{n_1-1,1-\alpha/2} \frac{\lambda}{\sqrt{n_1}} + t_{n_2-1,1-\alpha/2} \frac{\lambda}{\sqrt{n_2}}}{t_{d,1-\alpha/2} \sqrt{\frac{\lambda^2}{n_1} + \frac{1}{n_2}}} \quad (15)$$

where the degrees of freedom in (14) can also be written as

$$d = \frac{(\lambda^2 / n_1 + 1 / n_2)^2}{(\lambda^2 / n_1)^2 / (n_1 - 1) + (1 / n_2)^2 / (n_2 - 1)}. \quad (16)$$

It can be seen that

$$d = \frac{(\lambda^2 / n_1 + 1 / n_2)^2}{(\lambda^2 / n_1)^2 + (1 / n_2)^2} \min(n_1 - 1, n_2 - 1) > \min(n_1 - 1, n_2 - 1). \quad (17)$$

To answer the question of whether  $\tilde{\kappa}$  in (15) is larger than 1 or not, numerical exploration is needed.

Define the following quantity

$$\delta = \left( \bar{X}_1 - z_{1-\alpha/2} \frac{\sigma_1}{\sqrt{n_1}} \right) - \left( \bar{X}_2 + z_{1-\alpha/2} \frac{\sigma_2}{\sqrt{n_2}} \right). \quad (18)$$

If  $\delta \geq 0$ , then  $I_1(\alpha)$  and  $I_2(\alpha)$  are non-overlap. If  $\delta < 0$ , then  $I_1(\alpha)$  and  $I_2(\alpha)$  are overlap. Further, we can similarly define

$$\kappa(\delta) = \frac{\delta + \frac{\sigma_1}{\sqrt{n_1}} + \frac{\sigma_2}{\sqrt{n_2}}}{SD(\bar{X}_1 - \bar{X}_2)}. \quad (19)$$

Give the discussion above that even there is overlap, there is possibility that the means of the two groups can be significantly different.

In the following discussion, we are going to explore, how much overlap will tell us that the population mean difference  $\mu_1 - \mu_2$  will definitely be non-significant. Consider a simplified case, where  $\sigma_1 = \sigma_2 = \sigma$ ,  $n_1 = n_2 = n$  and variance are known. It is interesting to check the ratio of the overlap length  $|\delta|$  over the length of  $I_1(\alpha)$  or  $I_2(\alpha)$  (which are equal in this special case), that is,

$$\eta = \frac{|\delta|}{2z_{1-\alpha/2} \sqrt{\sigma/n}}. \quad (20)$$

On the other hand, the means of the two groups will not be significantly different if  $\kappa(\delta) \leq 1$ , that is,  $\frac{\delta}{\sqrt{\frac{2\sigma}{n}}} \leq$

$-\sqrt{2}$ , which implies

$$\eta \geq \frac{2\sqrt{\frac{\sigma}{n}}}{2z_{1-\frac{\alpha}{2}}\sqrt{\frac{\sigma}{n}}} = \frac{1}{z_{1-\frac{\alpha}{2}}}$$

For example, in the above hypothetical example, when the two confidence intervals overlap about 51% of the confidence interval, then we know that they will not be significantly different for sure.

## SUMMARY

In general, it is not recommended to compare two individual confidence intervals while checking whether there is significant difference between two population means.

- In practice, it is most often true (but not always) that non-overlap individual confidence intervals → significant difference between two groups. However, when sample sizes and variance between two groups substantially differ, non-overlap individual confidence intervals → significant difference.
- When two individual confidence intervals overlap, it does not mean that means of two groups are not significantly different. It depends on how much overlap they have. Two groups could have significantly different means when they have a small to medium amount of overlap in individual confidence intervals.

In practice, we recommend conducting careful two group comparison tests to see check whether there is significant difference between two groups.

## ENDNOTES

1. We are grateful for the helpful discussions, suggestions and comments from Monica Das, Juan R. Jaramillo, David Vitt and participants at the annual conference of the New York State Economics Association on October, 2017.
2. Programing codes for the table are available from the authors upon request.

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